COVID-19 Relevant Literature to Otolaryngology Practice

In Wuhan, ear, nose and throat (ENT) and eye doctors were infected at higher rates than colleagues in the same hospitals, Du Bin, director of the intensive care unit at Peking Union Medical College Hospital, said: "My personal interpretation is these doctors have very close contact with the patients, that's the major reason that they got easily infected," he said. "It's important to get doctors educated and trained on how to protect themselves." –Bloomberg News March 17, 2020 12:21am

Recommendations of the surgical staff of the otolaryngology and neck on the protection of the new coronavirus infection. Chinese Journal of Otolaryngology and Neck Surgery, 2020,55 (00): E001-E001. Xu Kai. Lai Xiaoquan. Liu Quan. Chinese Journal of Otolaryngology and Neck Surgery, 2020,55 (00): E001-E001. [Translated via translation software]

- For fever patients, regardless of whether they are infected with the new coronavirus pneumonia, the ear, nose, throat and neck surgery staff should do a good job of adequate protection.
- In the ear, nose and throat head and neck surgery special examination, can cause patients coughing, pharynx reflexes, sneezing, new coronavirus infection patients talk, cough, sneezing produced by droplets, can carry the virus splashed to a distance of 1 to 2 meters, and make the virus form aerosols
- Therefore, in the otolaryngology head and neck surgery clinic, it is recommended to reduce the relevant physical examination.
- For patients with new types of coronavirus infection that must be checked, the examination is recommended based on secondary protection
- for patients at risk of spraying, such as …nosebleed, outpatient emergency tracheotomy, tertiary protection should be done
- **Direct quote: "In view of the high-risk exposure of the ear, nose, throat and neck surgical staff, the non-acute and critical lying routine outpatient and ward work should be reduced as far as possible to cooperate with the national epidemic prevention and control"**
- Surgeons recommend three levels of protection and there is currently a lack of effective screening for people with the incubation period or asymptomatic virus.

Huang C, Wang Y, Li X et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 2020;395:497–506.

- Originated in bat to human transmission in a crowded Seafood market
- Spread through droplets and respiratory secretions (coughs, sneezes)
- Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China
- The time between hospital admission and ARDS was as short as 2 days.
- Mortality rate is high for 2019-nCoV, because six (15%) of 41 patients in this cohort died.
- Direct quote: "Airborne precautions, such as a fit-tested N95 respirator, and other personal protective equipment are strongly recommended. To prevent further spread of the disease in health-care settings that are caring for patients infected with2019-nCoV"
- **What does this mean for otolaryngologists?** By definition we are in intimate contact with all respiratory secretions (nasal, oral, laryngeal, and tracheal). Additionally we aerosolize the nose to provide comfort during nasal and laryngeal procedures. It makes sense to limit these contact opportunities in order to halt the spread of disease.

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Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus–Infected Pneumonia in Wuhan, China. Dawei Wang, MD; Bo Hu, MD; Chang Hu, MD; et al. JAMA. 2020;323(11):1061-1069

- Retrospective, single-center case series
- 138 consecutive hospitalized patients with confirmed novel coronavirus (2019-nCoV)–infected pneumonia (NCIP)
- median age was 56 years
- (54.3%) were men
- Fever 98.6%
- Most patients received antiviral therapy (oseltamivir, 124 [89.9%]
- Thirty-six patients (26.1%) were transferred to the intensive care unit (ICU)
    - ARDS 61.1%
- The median time from first symptom…
    - to dyspnea was 5.0 days
    - to hospital admission was 7.0 days
    - to ARDS was 8.0 days
- Median hospital stay was 10 days
- Overall mortality 4.3%

Consensus statement: Safe Airway Society principles of airway management and tracheal intubation specific to the COVID-19 adult patient group. Brewster DJ et al. Med J Aust. Published online: 16 March 2020 (ahead of print).

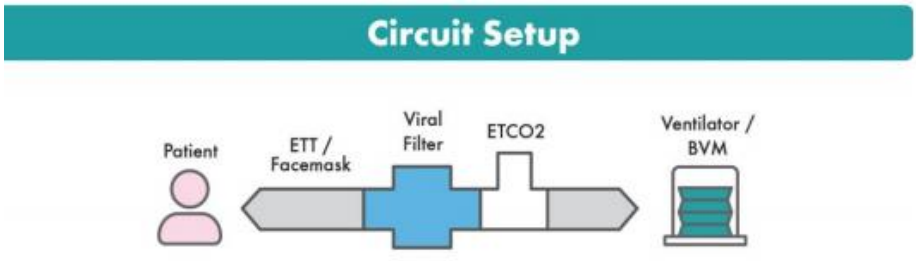
- Transmission of COVID-19 is primarily through droplet spread.
    - Droplets are affected by gravity and may cause direct transmission from close contact or contribute to surface contamination (where the virus may remain active for hours to days) (3).
- Coughing and some airway management procedures can generate aerosols composed of smaller virus containing particles suspended in air
- Table of aerosol generating events

Table 1: Aerosol generation during airway management

Aerosol generating events
• Coughing/sneezing • NIV or positive pressure ventilation with inadequate seal* • High flow nasal oxygen (HFNO) • Delivery of nebulised/atomised medications via simple face mask • Cardiopulmonary resuscitation (prior to intubation) • Tracheal suction (without a closed system) • Tracheal extubation
Procedures vulnerable to aerosol generation
• Laryngoscopy • Tracheal intubation • Bronchoscopy/Gastroscopy • Front-of-neck airway (FONA) procedures (including tracheostomy, cricothyroidotomy)

*The reliability of seal is greatest with tracheal tube>supraglottic airway>face mask

- These airborne particles may travel greater distances and be inhaled, increasing the risk of transmission
- COVID-19 has now been classified as a high consequence infectious disease (HCID), emphasizing the significant risk to HCWs and the healthcare system.
- Process for airway management
    - Pre-oxygenate
        - A minimum of 5minuted of pre-oxygenation is recommended if ETO2 is not available.
    - The use of high flow nasal oxygen for apnoeic oxygenation during intubation is not recommended given the risk to staff due to aerosolization of the virus.
    - Vice (V-E) grip is recommended to maximize the facemask seal
    - Minimize manual ventilation unless required for rescue
    - Continuous waveform capnography should be used if available
    - Use rapid sequence intubation (RSI) as the default technique
    - Initial neuromuscular blockade can be achieved with
        - rocuronium (>1.5mg/kg IBW) OR suxamethonium (1.5mg/kg TBW)
    - Minimize apnea time while ensuring adequate time is given for the NMBA to take effect to avoid precipitating coughing
    - Intubation (early tracheal intubation is best)
        - In clinicians proficient with its use, routine use of a videolaryngoscope is recommended for the first attempt at intubation.
        - Viewing the larynx using the indirect (video screen) view, with the operator standing upright and elbow straight, maximizes the distance between the Airway Operator's face and the patient.
        - Minimize cuff deflations.
        - Once the tube is placed, the cuff should be inflated before positive pressure ventilation is attempted.
        - The viral filter should be applied directly to the end of the tracheal tube.
        - Increasing the number of connections between the filter and the tracheal tube increases opportunities for disconnection and aerosolization of virus.



        - Cuff pressure should be monitored with a cuff manometer to ensure an adequate seal.
    - Extubation
        - Patients should ideally be ready for extubation onto facemask.
        - NIV and HFNO should be avoided where possible
        - Two staff members should perform extubation.

    - The same level of PPE should be worn for extubation as is worn during intubation
    - The patient should NOT be encouraged to cough.
    - A simple oxygen mask should be placed on the patient immediately post extubation to minimize aerosolization from coughing.
    - Oral suctioning may be performed, with care taken not to precipitate coughing
- **What this means for Otolaryngologists:** simply looking with a fiberoptic flex scope prior to intubation is not recommended. It does not change management in a suspected COVID-19 patient. The paper's gist is that if you are going to look, it is to intubate. Minimize cuff leaks (this may mean accepting higher than normal cuff pressures or using a larger tube than what we would normally suggest) in order to prevent aerosolization. Make sure a viral filter is present.

What Signs and Symptoms Present to Otolaryngologists? Sources: CDC and articles cited in this sheet

- **Anosmia**
    - Madrid (Guillermo Plaza, MD, PhD at Hospital Universitario Fuenlabrada)
    - 14 cases of anosmia related to COVID-19 as the earliest symptom
- **Cough**
    - Varies in literature from 59% to 77%
- **Fever**
    - If treating COVID-19 related fever use acetaminophen, not ibuprofen
        - Day M. Covid-19: ibuprofen should not be used for managing symptoms, say doctors and scientists. BMJ 2020;368
- **Pharyngitis**
- **Rhinorrhea**

Features, Evaluation and Treatment Coronavirus (COVID-19). Marco Cascella; Michael Rajnik; Arturo Cuomo; Scott C. Dulebohn; Raffaela Di Napoli. Istituto Nazionale Tumori - IRCCS - Fondazione Pascale, Via Mariano Semmola 80100, Napoli. Italy. Internet StatPearls

- CoVs are positive-stranded RNA viruses with a crown-like appearance under an electron microscope
- SARS-CoV-2 belongs to the betaCoVs category
    - Diameter of approximately 60–140 nm.
    - Sensitive to ultraviolet rays and heat
    - Effectively inactivated by lipid solvents including ether (75%), ethanol, chlorine-containing disinfectant, peroxyacetic acid and chloroform except for chlorhexidine.
    - Transmission through respiratory droplets from coughing and sneezing.
    - Aerosol transmission is also possible in case of protracted exposure to elevated aerosol concentrations in closed spaces.
    - Analysis of data related to the spread of SARS-CoV-2 in China seems to indicate that close contact between individuals is necessary. The spread, in fact, is primarily limited to family members, healthcare professionals, and other close contacts.
- What this means for Otolaryngologists: Do NOT use chlorhexidine scrubs

COVID-19 Relevant Literature to Otolaryngology Practice

Marco Cascella; Michael Rajnik; Arturo Cuomo; Scott C. Dulebohn; Raffaela Di Napoli.Expert Recommendations for Tracheal Intubation in Critically ill Patients with Noval Coronavirus Disease 2019. Zuo MZ, Huang YG, Ma WH3, Xue ZG, Zhang JQ, Gong YH, Che L; Chinese Society of Anesthesiology Task Force on Airway Management.

- Therefore, high-risk aerosol-producing procedures such as endotracheal intubation may put the anesthesiologists at high risk of nosocomial infections. In fact,
- SARS-CoV-2 infection of anesthesiologists after endotracheal intubation for confirmed COVID-19 patients have been reported in hospitals in Wuhan.
- The expert panel of airway management in Chinese Society of Anaesthesiology has deliberated and drafted this recommendation, by which we hope to guide the performance of endotracheal intubation by frontline anesthesiologists and critical care physicians.
- During the airway management, enhanced droplet/airborne PPE should be applied to the health care providers.
- For patients with normal airway, awake intubation should be avoided and modified rapid sequence induction is strongly recommended.
- Sufficient muscle relaxant should be assured before intubation. For patients with difficult airway, good preparation of airway devices and detailed intubation plans should be made.
- **What this means for otolaryngologists:** Airway scoping procedures directly contact respiratory secretions with potential for direct transfer. These are potentially high-risk procedures that require enhanced droplet/airborne PPE. If PPE is scarce, these procedures should not be performed for non-urgent or non-emergent patients.

Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. Xiaobo Yang, Yuan Yu, Jiqian Xu, Huaqing Shu, Jia'an Xia, Hong Liu, Yongran Wu, Lu Zhang, Zhui Yu, Minghao Fang, Ting Yu, Yaxin Wang, Shangwen Pan, Xiaojing Zou, Shiying Yuan, You Shang

- Single center, retrospective, observational study
- 710 patients with SARS-CoV-2 pneumonia
- Survivors compared to non-survivors
- 52 critically ill adult patients admitted to the intensive care unit (ICU)
    - Mean age 59
    - 35 (67% men)
    - 40% chronic illness hx
    - 98% had fever
    - 61.5% died at 28 days
    - median duration from admission to the intensive care unit (ICU) to death was 7 days
    - non-survivors
        - were older (64.6 years vs 51.9 years [12·9]),
        - more likely to develop ARDS (26 [81%] patients vs 9 [45%] patients),
        - more likely to receive mechanical ventilation (30 [94%] patients vs 7 [35%] patients), either invasively or non-invasively
        - Most patients had organ function damage, including
            - (67%) with ARDS
            - (29%) with acute kidney injury

        - (23%) with cardiac injury
        - (29%) with liver dysfunction, and
        - one (2%) with pneumothorax.
    - (71%) patients required mechanical ventilation.
  - Hospital-acquired infection occurred in seven (13.5%) patients.
- **What this means for Otolaryngologists:** if the median admission to ICU to death is in 7 days, tracheostomy procedures are NOT really necessary. They result in vast aerosolization of viral particles which ultimately do not seem improve prognosis.

Do we perform Tracheostomy Tube Placement and Tube Changes During the Pandemic?

- **The South African Society of Otorhinolaryngology has Published Guidelines for Tracheostomy and Tracheostomy Tube Changes during the COVID-pandemic**
  - Intubation rather than tracheostomy tube placement is preferable
  - Reduce all unnecessary team members to essential staff
  - If irreversible cause of airway obstruction is present (ie laryngeal mass, severe subglottic stenosis), tracheostomy should be performed
    - Not advised to debulk or manipulate airway in COVID-19 positive patients
  - Elective
    - COVID-19 testing to be performed in ALL patient's prior to tracheostomy
    - High-risk procedure due to aerosolization
    - Discuss appropriateness for tracheostomy with ICU staff prior to proceeding
    - If COVID-19 negative, proceed with standard operating procedure (SOP)
    - If COVID-19+, proceed with N95, eye protection +SOP with extreme caustion, swiftly and only with essential staff
- **What this means for Otolaryngologists:** meticulously chart check and check chest x-rays/chest-CTs prior to considering trach. Discuss with ICU if it is really necessary at this time. Consider getting a COVID-19 prior to proceeding with trach (especially if patient has been inpatient for some time, febrile with pneumonia)

What is the American Academy of Otolaryngology Recommending?

- Recommend "Limiting all non-essential planned surgeries and procedures, including dental, until further notice" as proposed by CMS
- Tiered surgical framework as indicated by CMS and ACS
- Evolving evidence that otolaryngologists are among the highest risk group when performing upper airway surgeries and examinations.
- A high rate of transmission of COVID-19 to otolaryngologists has been reported from China, Italy, and Iran, many resulting in death
- Viral density is greatest in the nose and nasopharynx.
- Instrumentation in and through these areas would expectedly lead to increased risk.
- Powered debriders and shavers as well as drilling further promotes possible infectious microdroplet diffusion
- Recommendations do not specifically address procedures necessary in certain circumstances for a complete otolaryngologic exam, such as flexible laryngoscopy with or without stroboscopy and nasal endoscopy, these criteria can be extended to that type of procedure.

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- Extreme caution when advising procedures or surgery occurring through a transnasal or trans-oral route.
- During in-office examinations, topical medications are more safely applied using pledgets rather than by spray.
- Surgical procedures should be performed only after ascertaining the COVID-19 status and if positive performed only with PAPR.

Scheduling of Visits and Procedures

Source: CDC www.cdc.gov as of 3/18/2020

- Delay all elective ambulatory provider visits
- Reschedule elective and non-urgent admissions
- Delay inpatient and outpatient admissions
- Postpone routine dental and eyecare visits

Scheduling of Surgical Cases

Source: CMS Adult Elective Surgery and Procedures Recommendations:

- Limit non-essential adult elective surgery and medical and surgical procedures, including all dental procedures
- Recommending that all non-essential dental exams and procedures be postponed until further notice
- Tiered framework case-by-case evaluations as to whether planned surgery should proceed as recommended by ACS below

Source: American College of Surgeons "COVID-19: Guidance for Triage of Non-Emergent Surgical Procedures"

Main Points

- Hospitals and surgery centers should consider both their patients' medical needs, and their logistical capability to meet those needs, in real time.
- The medical need for a given procedure should be established by a surgeon with direct expertise in the relevant surgical specialty to determine what medical risks will be incurred by case delay.
- Logistical feasibility for a given procedure should be determined by administrative personnel with an understanding of hospital and community limitations, taking into consideration facility resources (beds, staff, equipment, supplies, etc.) and provider and community safety and well-being.
- Case conduct should be determined based on a merger of these assessments using contemporary knowledge of the evolving national, local and regional conditions, recognizing that marked regional variation may lead to significant differences in regional decision-making.
- The risk to the patient should include an aggregate assessment of the real risk of proceeding and the real risk of delay, including the expectation that a delay of 6-8 weeks or more may be required to emerge from an environment in which COVID-19 is less prevalent.
- ACS suggests that surgeons look at the Elective Surgery Acuity Scale (ESAS) from St. Louis University (below).
- From: Sameer Siddiqui MD, FACS, St Louis University

Tiers/Description	Definition	Locations	Examples	Action

Tier 1a	**Low acuity surgery/healthy patient** Outpatient surgery Not life threatening illness	HOPD ASC Hospital with low/no COVID- 9 census	Carpal tunnel release Penile prosthesis EGD Colonoscopy	Postpone surgery or perform at ASC
Tier 1b	**Low acuity surgery/unhealthy patient**	HOPD ASC Hospital with low/no COVID-19 census		Postpone surgery or perform at an ASC
Tier 2a	**Intermediate acuity surgery/healthy patient** Not life threatening but potential for future morbidity and mortality. Requires in hospital stay	HOPD ASC Hospital with low/no COVID-19 census	Low risk cancer Non urgent spine Ureteral colic	Postpone surgery if possible or consider ASC
Tier 2b	**Intermediate acuity surgery/unhealthy patient**	HOPD ASC Hospital with low/no COVID-19 census		Postpone surgery if possible or consider ASC
Tier 3a	**High acuity surgery/healthy patient**	Hospital	Most cancers Highly symptomatic patients	Do not postpone
Tier 3b	**High acuity surgery/unhealthy patient**	Hospital		Do not postpone

- **HOPD** – Hospital Outpatient Department
  ASC – Ambulatory Surgery Center