



SPECIAL ARTICLE COVID-19

Ear, Nose, and Throat Practice Guidelines: An Update for COVID-19

Sahil Kapoor¹ Ayushi Gupta¹ Poonam Kumar Saidha¹ ¹ Department of Ear, Nose, and Throat, Faculty of Medicine and Health Sciences, SGT University, Gurgaon, Haryana, India

Address for correspondence Dr. Poonam Kumar Saidha, Associate Professor, Department of ENT, FMHS, SGT University, Gurgaon, Haryana, India (e-mail: poonamsaidha@gmail.com).

Int Arch Otorhinolaryngol 2021;25(4):e621–e627.

Abstract

Introduction Amidst another wave of COVID-19, the alarming number of cases per day in India has affected the healthcare system and professionals tremendously. As the disease burden continues to increase, ear, nose, and throat (ENT) specialists remain at high risk of exposure to this aerosol borne virus. This requires the creation and regulation of protocols for conducting routine clinical practice, especially by ENT specialists.

Objectives To review the available literature and to propose strategies and recommendations for ENT practitioners to conduct their regular practice amidst this pandemic.

Data synthesis A systematic review of the available literature on ENT practice during the COVID-19 pandemic was done. Out of the many protocols proposed in various studies, the most practical and feasible ones that could be adopted by practicing ENT doctors/ surgeons in the long run were selected. Adequate precautions and use of high level of personal protective equipment (PPE) is required to be adopted by all practicing ENT doctors. Use of teleconsultation has been promoted as it limits face-to-face exposure. Proper guidelines should be followed for both emergency and elective surgeries. Endoscopy can be used as a safe and useful tool for ENT examination.

Conclusion As practicing otorhinolaryngologists, it is of utmost importance that we take all necessary precautions and adopt safety measures in our clinical practice while conducting out patient department (OPD) consultations, operative procedures, and emergency care to protect our patients, ourselves, and other healthcare staff during this time.

Keywords

- ▶ COVID-19
- ▶ otorhinolaryngology guidelines
- ▶ tracheostomy
- ▶ SARS-CoV-2

Introduction

The novel coronavirus (SARS-CoV-2) infection, also known as COVID-19, was declared a pandemic by the World Health Organization (WHO) in March 2020.¹ The ongoing pandemic is becoming more complex and increasingly difficult to control, both in terms of morbidity and mortality rates due to rapid transmission.^{1,2} The outbreak in most countries,

whether developed ones like the USA with modern and advanced medical systems or developing countries like India, has been overwhelming with an increasing daily number of new cases being higher than ever before.²

As we are currently during another wave of COVID-19 with an alarming number of cases, now higher than ever before in India, there is an unforeseeable strain on both healthcare systems and healthcare professionals around the

received
May 7, 2021
accepted after revision
August 4, 2021

DOI <https://doi.org/10.1055/s-0041-1736424>.
ISSN 1809-9777.

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Thieme Revinter Publicações Ltda., Rua do Matoso 170, Rio de Janeiro, RJ, CEP 20270-135, Brazil

globe. It is important to take a step forward and make some changes in our day-to-day practice of medicine.³ The usual practice of an ear, nose, and throat (ENT) specialist has been affected and changed a lot in this pandemic. Within a very short period, all clinical services had to be modified and restructured in a way that catered best to the needs of the patients while also keeping our safety in mind. Various innovative methods have also been employed to teach trainees and share knowledge with colleagues.⁴

It is a well-established fact now that COVID-19 spreads mainly by aerosol mechanism and, to a lesser extent, by touch or contact method.⁵ As ENT practitioners, we are more prone to contracting the virus, as many of our procedures are aerosol generating. Studies have also shown that intranasal and temporal bone drilling aerosolizes bone dust, blood and mucosa. Working in close proximity to infected tissues for lengthy periods, we may be exposed to large infectious doses.⁴

As this disease is expected to last longer than it was initially thought of, if healthcare professionals and workers fall prey to this deadly virus, it will not only affect their health, but they could also transmit the infection to others, hence propagating the pandemic, leaving no more healthcare workers to assist on the frontlines.⁴ Thus, we as doctors and healthcare professionals need to formulate and adapt to new ways in order to protect ourselves and our patients against this deadly virus while continuing to provide a standard of quality care to our patients.

The aim of the present study is to review the available literature and propose strategies and recommendations for ENT practitioners around the world. We plan to establish a COVID-19 protocol for all practicing doctors in the field of ENT in such a way that does not hamper their routine practice while protecting them from exposure to the virus.

Review of the Literature

A meta-analysis of the available literature on ENT practice during the COVID-19 pandemic with emphasis on protocols for patients attending ENT OPD, OT, emergency, and ENT doctors was done. Using PubMed and google scholar as the biomedical databases in the present study, keywords such as *COVID-19*, *SARS-CoV-2*, *otorhinolaryngology* and *ENT protocols* were used to identify the studies for potential review

Guidelines for Reception and Waiting Areas^{4,6-8}

- Temperature should be checked for all people upon entry into the premises.
- All patients and their attendants should wear a mask, preferably N95 mask, at all times.
- One attendant per patient should be allowed.
- Maintaining safe and social distancing among patients in the waiting area is advised.
- Hand sanitization by all is a must.

- Floor markings at a distance of one meter with the reception desk/counter to ensure social distancing.
- The receptionists should sit across a glass partition over the desk for communication with the patient and should always wear a face mask.
- The area should be well ventilated.
- Stationary or portable high efficiency particulate air (HEPA) filtration systems with and without air re-circulation, that is, indoor air purifiers, can be used for air purification.⁷
- Solutions containing between 62 and 71% ethanol, 0.5% hydrogen peroxide or 0.1% sodium hypochlorite can be used for surface disinfection with a minimum contact time of 1 minute.⁸
- Fumigation of the area with at least 0.5% hydrogen peroxide solution can also be done.⁸
- Information boards regarding necessary precautions such as use of mask, importance of hand hygiene and social distancing should be displayed for awareness.

Adopting ENT Teleconsultation Practice^{6,9,10}

- Teleconsultation and telemedicine should be promoted amongst the patients.
- It allows continuity of care of patients who cannot travel, thus limiting the preventable risks of spreading the coronavirus within ENT private practices and healthcare facilities
- Remote hearing tests for adult patients and more cautiously for older children in whom audiometry without conditioning is possible are also being developed.¹⁰
- Periodical follow-up and evaluation is a vital part of telemedicine.¹¹

Guidelines for OPD/Doctor's Office^{4,6,8,9}

- Both patient and doctor should wear a mask.
- Safe distance between doctor and patient of at least 1 meter, except while examining the patient should be maintained.
- The choice of personal protective equipment (PPE) depends on the professional: N95 RDP/FFP2/ FFP3/ P100 masks, protective goggles, surgical gown/disposable sterile gowns/single use plastic aprons.¹²
- Doctor's office should be well ventilated.
- Portable air purifiers with HEPA filtration systems should be installed in the OPD.⁸
- Use of endoscope for ENT examination to allow safe distance between doctor and patient.
- All endoscopies should be done after wearing proper PPE equipment (following proper donning and doffing protocols) in a designated room.

Categorization of Aerosol-generating Medical Procedures (AGMP) and Non-aerosol Generating Medical Procedures (Non-AGMP) (– Table 1)

- In a recent study, SARS-CoV-2 has been found to be transmitted primarily by the airborne route.^{13,14}
- Most ENT outpatient procedures are at risk of generation of aerosols as deep instrumentation and/or excessive mucous or blood can induce cough reflex.

Table 1 Classification of ENT examination/procedures with and without risk of aerosol generation.

Examination/procedure at risk of aerosol generation:
• Oral cavity and oropharynx
• Nasal cavities, sinuses and nasopharynx with or without rigid endoscope
• Pharynx, larynx with a laryngeal mirror, a nasal endoscope or nasopharyngoscope
• Tracheotomy and tracheostomy
• Bronchoscopy
• Bone drilling
• Use of electrocautery, harmonic devices, suction and irrigation
Examination/procedures not at risk of aerosol generation:
• Otoendoscopy or microscopy
• Head and neck examination
• Functional exploration of hearing
• Functional exploration of vestibular apparatus
• Sleep study

- Studies also show that use of electrocautery, ultrasonically activated (Harmonic) devices and suction irrigation can aerosolize blood droplets and tissue particles while intranasal and temporal bone drilling aerosolize bone, blood, and mucosa^{4,15,16}
- Aerosols are also generated by “pursed lip” breathing methods, coughing, and even normal breathing.¹⁷
- Head and neck physical examinations are not typically classified as AGMP.⁴

Precautions While Performing AGMP and Non-AGMPs⁴

- Proper PPE equipment should be worn by the doctor performing the procedure.
- The examination/procedure room should be well ventilated.
- P100 mask or Powered Air-Purifying Respirator (PAPR) and full PPE should be worn while performing AGMPs and be properly disposed after use.
- For non-AGMPs, N95 masks and a disposable sterile plastic gown over a surgical gown can also be worn along with eye protective goggles, face shield, double nitrile gloves, and shoe cover.
- After performing AGMPs, the procedure room should be disinfected and fumigated before taking in the next patient.

Guidelines for Patients Requiring Elective Surgical Procedures⁶

- After admission, oropharyngeal or nasopharyngeal swab should be taken for real time polymerase chain reaction (RT-PCR) test.
- Only patients who test negative on RT-PCR should be taken into the operating room.
- In case a patient tests positive, the patient should be shifted to a designated COVID-19 ward for further management.

Guidelines for Operating Rooms

- Asymptomatic patients after negative RT-PCR test can be taken up for surgery.
- Minimal staff and limited team of doctors should be present in the OT.^{18,19}
- While performing non-AGMPs on patients who have tested negative for COVID-19, one should wear N95 mask or P100 mask, a sterile disposable gown, one pair of gloves, eye and face protection devices, and shoe covers.⁶
- When performing AGMPs in COVID-19 negative patients, one should wear P100 mask or PAPR, one disposable gown and a sterile disposable gown above it, two pairs of gloves plus a sterile one, eye and face protection devices, a cap, a surgical drape around the neck, and two shoe covers.⁶
- Develop and implement surgical safety checklists for both elective and emergency procedures.²⁰

Specific Guidelines for Common ENT Emergencies

There are several ENT conditions with which a patient can present to the emergency. After taking adequate precautions, ENT emergencies can be dealt with according to the following recommendations by several studies:

Epistaxis²¹

- In case of active uncontrolled epistaxis, anterior or posterior nasal packing should be done as required, preferably with merocel, taking adequate precautions.
- Nasal pack should be removed in OT after RT-PCR test is done taking all precautions.
- Diagnostic nasal endoscopy (DNE) should be undertaken only in cases of uncontrolled epistaxis not resolved by conservative management and may require chemical cauterization.

Foreign bodies in ENT:

1. Foreign bodies of aerodigestive tract require early removal as they may cause acute life-threatening complications at anytime.²²
2. Foreign bodies of nose can be removed with use of endoscope instead of anterior rhinoscopy.²³
3. Foreign bodies of ear can be removed by otoendoscopy wearing disposable gown, N95 mask and face shield.²³

Tracheostomy:

- It is advisable to perform tracheostomy at the bedside of the patient in the ICU with a team consisting of an expert ENT surgeon, an assistant, an anesthesiologist, and nursing staff.²⁴
- Open surgical tracheostomy should be preferred over percutaneous tracheostomy as it involves extensive airway manipulation, is more time consuming, and increases the exposure to aerosolized secretions during the procedure.²⁵
- One should keep in mind to carefully remove the endotracheal tube under the cover of a plastic sheet to avoid aerosol spread, and the tube should be immediately disposed in a closed container.²⁴
- Early tracheostomy should be avoided in suspected or COVID-19-positive patients to reduce viral load transmission. It should be delayed until when ventilator weaning is required and the patient has high chances of recovery.¹⁶

Guidelines for Emergency Surgery

- If patient is stable, one can get rapid antigen test done as priority. A RT-PCR test is always preferred.
- Proper donning and doffing of PPE, a designated COVID-19 operating room allowing minimal personnel to be present and clearing out unnecessary equipment.²⁰
- The air conditioning and laminar flow should be off during procedures, especially those involving airway emergency conditions with the temperature maintained at 20°C in the OT.
- The surgeon should enter the OT 10 minutes after intubation and exit before extubation to minimize their exposure to aerosols.²³
- Minimizing operating time is vital to limit the risk of aerosol transmission.

Risk Stratification

- Classification of patients as low-risk, intermediate-risk and high-risk on the basis of symptoms, contact history with a covid patient, travel history, or stay in high-risk area.^{11,26} (→ **Table 2**)
- This can be helpful while dealing with patients on an OPD basis and while planning a surgery.

Prioritization of Cancer Patients

- Addressing head and neck cancer patients needs to be prioritized considering the ongoing pandemic to reduce morbidity and mortality rates associated with cancer.
- Color-coded categorization of cancer patients has been established based on tumor features and patient-associated factors graded according to the American Society of Anaesthesiologists (ASA) score:¹¹
 - **RED: High priority** cases including cancer-associated emergencies, not amenable to endoscopic or nonsurgical treatment, with any ASA score in patients < 80 years old, or in ASA 1 or 2 in case of older patients; surgery should be performed within 2 weeks.
 - **YELLOW: Intermediate priority** includes cancers that are potentially curable with surgery, without any pharmacological, endoscopic, radiotherapy alternatives, in patients of any age, with ASA 1 or 2; surgery should be performed within 2 months.
 - **GREEN: Low priority** includes cancers amenable to pharmacological, endoscopic, radiotherapy and early-stage cancers (that is, T1N0) or less aggressive cancers; surgery can be performed after 2 months.

Personal Protective Equipment²⁷

- Training of proper donning and doffing of PPE is of paramount importance to ensure optimal safety while dealing with suspected/confirmed COVID-19 patients.
- A critical shortage and unavailability of proper PPE equipment was reported with an abrupt rise of cases and increased global demand due to the pandemic.
- Use of PPE has been reported to impact surgical performance and nontechnical skills such as communication, situational awareness, decision making, fatigue control, and visibility impairment with fogging of glasses.

Table 2 Risk stratification of patients

RISK STRATIFICATION	
<u>LOW RISK</u>	No symptoms No contact with COVID-19 No travel history or stay in areas at risk in the past 14 days
<u>INTERMEDIATE RISK</u>	Symptoms like fever, cough, dyspnea, diarrhea No contact with COVID-19 No travel history or stay in areas at risk in the past 14 days
<u>HIGH RISK</u>	Presence of at least one symptom (fever, cough, dyspnea, diarrhea) At least one of the following: Contact with COVID-19 Stay in areas at risk in the past 14 days

Discussion

Throughout the COVID-19 pandemic, our surgical and clinical practices have been affected and significantly altered as SARS-CoV-2 has been found to be present in the nose and throat in symptomatic and asymptomatic COVID-19 patients.^{6,28} As this infectious disease affects people in all age groups and all kinds of patients,⁶ it is important to adopt newer ways to change our daily practice by creating adequate protocols for ENT doctors and staff in order to provide quality patient care. Out of the many protocols proposed in several studies, the most practical and feasible ones were selected. Based on the data obtained, the authors recommend the following protocols that can be adopted by practicing ENT doctors and surgeons in the long run.

Many practitioners around the world are now adopting teleconsultation as a new and improved way of conducting their regular practice.⁹ As seen in a study by Marchioni D, categorization of patients can be done on the basis of their presenting complaints such as those requiring only medical treatment and counselling without consultation and those requiring face-to-face consultations at the doctor's office for proper evaluation. This minimizes the risk of exposure of both patient and doctor (►Figure 1).⁶ Until a defined perspective of this pandemic is known, rescheduling outpatient visits should be avoided and, instead, regular follow-up and periodical evaluation should be ensured, especially in patients of head and neck cancer.¹¹

The healthcare professional can choose the type of PPE to be worn ranging from N95 RDP/FFP2/ FFP3/ P100 masks, protective goggles, and surgical gown/disposable sterile gowns/ single use plastic aprons. The P100 mask offers 99.97% filtration efficacy, while the N95 has 95% filtration efficacy. However, PAPRs have 100% efficacy, but they are

significantly more expensive than other types of respirators and might be difficult to wear for longer durations.¹²

We recommend that all endoscopies should be done through a plastic sheet, after wearing proper PPE equipment (following proper donning and doffing protocols); especially while performing nasal or laryngeal endoscopies. The risk of aerosol exposure while performing endoscopic procedures is inversely related to the distance between the doctor and the patient.¹¹ It is also important to ensure proper disinfection of endoscopes as advised by Yeolekar et al., use of 2% glutaraldehyde (Cidex) solution for disinfection with at least between 5 and 10 minutes after every use. Other ENT steel instruments should be autoclaved.¹³ A gap of at least 5 minutes between 2 patients during consultation and of at least 15 minutes after endoscopy is also advisable.

Solutions containing between 62 and 71% ethanol, 0.5% hydrogen peroxide or 0.1% sodium hypochlorite can be used for surface disinfection with a minimum contact time of 1 minute.⁸ Fumigation of the area with at least 0.5% hydrogen peroxide solution spray can also be done; however, many studies are now opposing this as fumigation can cause adverse effects.⁸

As it has been proven that the SARS-CoV-2 virus is aerosol borne, it is important to have a proper air filtration and purification system in place. We recommend the use of stationary or portable HEPA filtration systems without and with air recirculation in waiting areas and consultation rooms.⁷ A similar principle also applies to operating rooms, where central air conditioning with dedicated fresh air cycles with HEPA filters and independent Air Handling Unit (AHU)⁶ can be installed depending upon the size of the OT.¹⁹

►Figure 2 illustrates the protocol that can be adopted by surgeons and the associated staff while taking up a patient for an elective procedure. Operative procedures like micro-laryngeal surgeries, esophagoscopy, otological surgeries

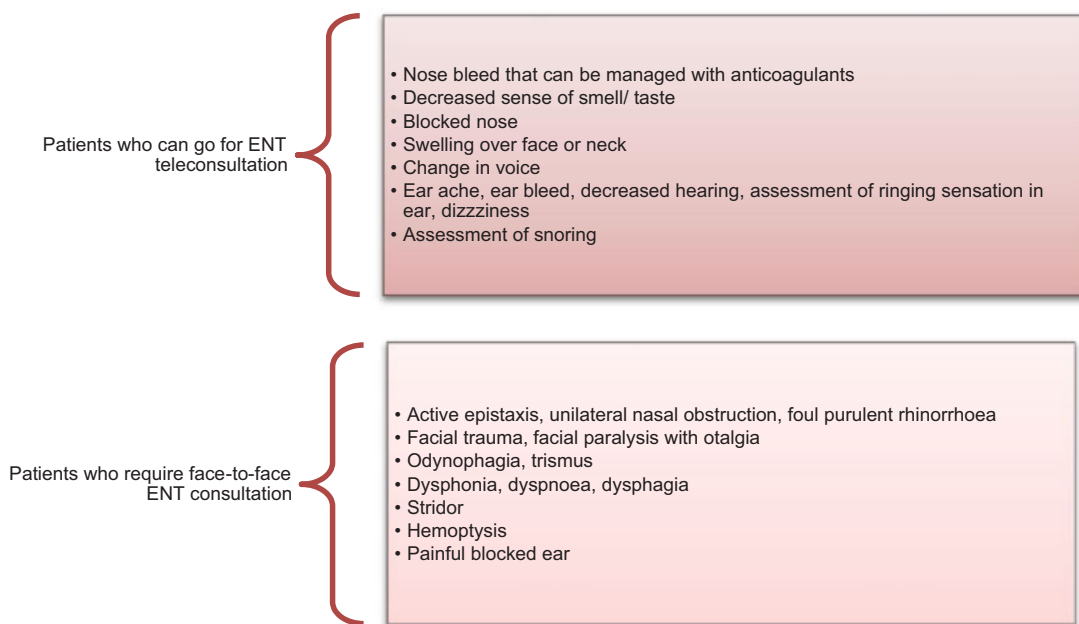


Fig. 1 Categorization of patients for the type of consultation.⁹

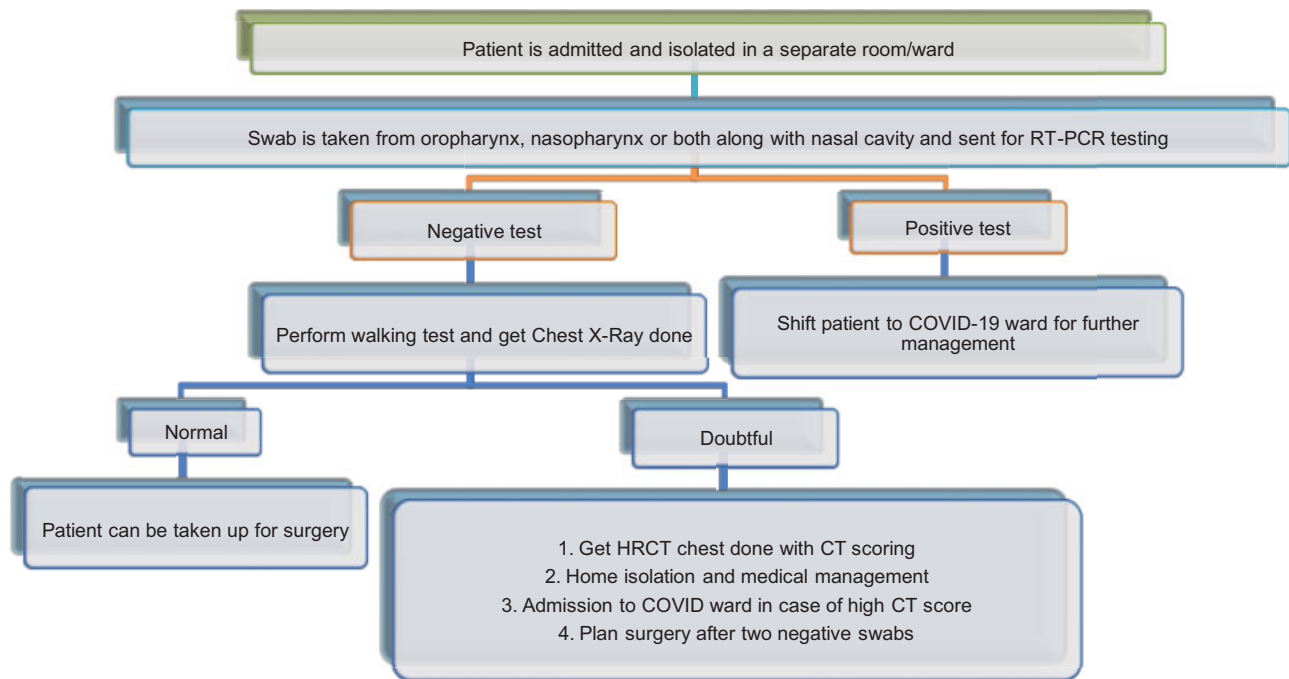


Fig. 2 Planning a patient for surgery during COVID-19 times.

with microscope, and endoscopic nasal surgeries and instrument handling can be done under a plastic sheet with U-shaped flaps for entry and exit of hands mount over an acrylic box to prevent any spread of possible infection and ensuring a complete no touch technique.¹³

In many countries, preparing and implementing COVID-19-specific surgical safety protocols and checklists have become an integral part of elective and emergency surgical management to ensure safety of all team members. Inspired by the Lifebox foundation and Jhpiego, Ambulkar et al. proposed a modified surgical safety checklist to ensure specific, measurable, achievable, result focused and time bound (SMART) goals.²⁹

Even in the uncertain times of this pandemic, an ENT doctor must be prepared to deal with emergency conditions according to each situation. All patients coming to the emergency with unknown COVID-19 status should be dealt with promptly, yet in a careful and systematic manner so as to protect ourselves and other staff members from contracting the virus. These patients should be treated as COVID-19-positive until proven otherwise, since in an emergency one cannot wait for RT-PCR testing and reporting. After taking all the necessary precautions, that is, wearing N95 mask, eye protective goggles, face shield, disposable gown, double gloves, and shoe covers, one should approach these patients for initial assessment in the emergency room.^{22,23} Based on our analysis of the available literature for handling emergencies in the COVID-19 era, the doctor can decide whether rapid antigen testing can be done before performing any emergency intervention, depending on the general condition of the patient. In emergency cases, in which one has to operate on a patient with unknown COVID-19 status, a strict protocol must be followed, that is, a separate emergency OT or negative pressure rooms should be designated (if possible) for these patients, with a limited number of staff and doctors,

full PPE should be worn, general anesthesia should be avoided, the OT must be fumigated after the procedure, and a gap of between 2 and 3 hours must be observed before utilizing the OT for the next case. Care must be taken while donning and doffing the PPE. The most common ENT emergency conditions encountered are epistaxis, foreign body of the aerodigestive tract and of the nose and ear, and patients requiring tracheostomy.^{21,23–25}

Tracheostomy is a life-saving procedure but is a highly aerosol-generating procedure that also poses a risk to healthcare workers of acquiring the infection during the procedure. It is indicated for facilitation of long-term mechanical ventilation and to reduce the complications associated with endotracheal intubation and weaning off from ventilation. Other conditions include threatened airway obstruction, laryngeal edema (an emerging feature of COVID-19), or unsuccessful extubation.³⁰

Conclusion

With the emergence of COVID-19 in December 2019 and its newer strains in 2021, this pandemic disease has expanded and impacted billions of people all over the world, and now, with the repeatedly mutating COVID-19 virus and no treatment options available to us, the doctors somehow need to manage their practices without further adding to the mayhem.

As practicing otorhinolaryngologists, it is of utmost importance that we take all necessary precautions and modify our clinical practice while conducting OPD consultations, operative procedures, and emergency care to protect our patients, ourselves, and other healthcare staff during this time. Hence, doctors need to fearlessly treat not only COVID-19 patients but also those with other diseases.

All the guidelines that can be put into use by practitioners at their setup have been highlighted in our study. Although these are effective and feasible for everyone, there is scope for improvement in this field. With the discovery of newer and more effective methods against the virus, the guidelines can be updated.

Ethics Clearance

Obtained from institutional ethics committee.

Funding

None.

Conflict of Interests:

The authors have no conflict of interests to declare.

References:

- Revathishree K, Shyam Sudhakar S, Indu R, Srinivasan K. Covid-19 Demographics from a Tertiary Care Center: Does It Depreciate Quality-of-Life? *Indian J Otolaryngol Head Neck Surg* 2020; **64**:1–8. Doi: 10.1007/s12070-020-02144-w
- Dao TL, Hoang VT, Gautret P. Recurrence of SARS-CoV-2 viral RNA in recovered COVID-19 patients: a narrative review. *Eur J Clin Microbiol Infect Dis* 2021; **40**(01):13–25
- Tysome JR. Improving clinical practice in ENT: Lessons learnt from the COVID-19 pandemic. *Clin Otolaryngol* 2021; **46**(02):295–296
- Mick P, Murphy R. Aerosol-generating otolaryngology procedures and the need for enhanced PPE during the COVID-19 pandemic: a literature review. *J of Otolaryngol – Head & Neck Surg* 2020; **49**(29). Doi: 10.1186/s40463-020-00424-7
- Greenhalgh T, Jimenez JL, Prather KA, Tufekci Z, Fisman D, Schooley R. Ten scientific reasons in support of airborne transmission of SARS-CoV-2. 2021. Available from: [https://doi.org/10.1016/S0140-6736\(21\)00869-2](https://doi.org/10.1016/S0140-6736(21)00869-2) www.thelancet.com
- Marchioni D, Bisi N, Molteni G, Rubini A. Covid-19 and ENT practice: Our experience: ENT outpatient department, ward and operating room management during the SARS-CoV-2 pandemic. *Am J Otolaryngol* 2020 Nov-Dec; **41**(06):102676. Doi: 10.1016/j.amjoto.2020.102676
- EMW filtertechnik ISO 29463: new test standard for HEPA filters. [cited 2020 Jun 3]. Available from: <https://www.emw.de/en/filter-campus/iso29463.html>
- Cleaning and disinfection of environmental surfaces in the context of COVID-19. WHO/2019-nCoV/Disinfection/2020.1
- Lescanne E, van der Mee-Marquet N, Juvanon JM, et al. Best practice recommendations: ENT consultations during the COVID-19 pandemic. *Eur Ann Otorhinolaryngol Head Neck Dis* 2020; **137**(04):303–308
- Thai-Van H, Bakhos D, Bouccara D, Loundon N, Marx M, Mom T, et al. Telemedicine in Audiology. Best practice recommendations from the French Society of Audiology (SFA) and the French Society of Otorhinolaryngology-Head and Neck Surgery (SFORL). *Eur Ann Otorhinolaryngol Head Neck Dis* 2021 Oct; **138**(05):363–375. Doi: 10.1016/j.anorl.2020.10.007
- Di Saverio S, Pata F, Gallo G, et al. Coronavirus pandemic and colorectal surgery: practical advice based on the Italian experience. *Colorectal Dis* 2020; **22**(06):625–634. Doi: 10.1111/codi.15056
- Centers for Disease Control and Prevention. The National Personal Protective Technology Laboratory (NPPTL). NIOSH-Approved Particulate Filtering Facepiece Respirators. 2020 [cited 2020 Apr 12]. Available from: https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/default.html
- Yeolekar A, Bhalerao S, Bhalerao M. The New Normal of ENT OPD: Adapting Safe Practices. *Indian J Otolaryngol Head Neck Surg* 2020; **64**:1–7. Doi: 10.1007/s12070-020-02140-0
- Jewett DL, Heinsohn P, Bennett C, Rosen A, Neuilly C. Blood-containing aerosols generated by surgical techniques: a possible infectious hazard. *Am Ind Hyg Assoc J* 1992; **53**(04):228–231
- Yeh H, Turner R, Jones R, Muggenburg B, Lundgren D, Smith J. Characterization of aerosols produced during surgical Procedures in hospitals. *Aerosol Sci Technol* 1995; **22**(02):151–161
- Hassan MS, Trotter MI. Protection from epistaxis blood aerosol contamination: a novel use of a surgical facemask. *Eur Arch Otorhinolaryngol* 2003; **260**(05):242–243. Doi: 10.1007/s00405-002-0510-x
- Givi B, Schiff BA, Chinn SB, et al. Safety Recommendations for Evaluation and Surgery of the Head and Neck During the COVID-19 Pandemic. *JAMA Otolaryngol Head Neck Surg* 2020; **146**(06):579–584. Doi: 10.1001/jamaoto.2020.0780
- Davies E, Hopkins C, Harries P, Walker A, Heward E. COVID-19 Epistaxis Management. *ENT UK*. 2020. [Internet]. Available from: <https://www.entuk.org/sites/default/files/files/COVID%2019%20Epistaxis%20Management.pdf>
- Malhotra N, Bajwa SJS, Joshi M, Mehdiratta L, Trikha A. COVID Operation Theatre- Advisory and Position Statement of Indian Society of Anaesthesiologists (ISA National). *Indian J Anaesth* 2020; **64**(05):355–362
- Yáñez Benítez C, Ribeiro MAF Jr, Alexandrino H, et al. International cooperation group of emergency surgery during the COVID-19 pandemic. *Eur J Trauma Emerg Surg* 2021; **47**(03):621–629
- Bressler K, Shelton C. Ear foreign-body removal: a review of 98 consecutive cases. *Laryngoscope* 1993; **103**(4 Pt 1):367–370
- Sebastian GP, Subbarayan R, Nagarajan S. Foreign Bodies Surpassed in Ear, Nose, Throat during COVID-19 Lockdown: Triage and Challenges. *Ann Clin Otolaryngol* 2020; **5**(02):1045
- McGrath BA, Brenner MJ, Warrillow SJ, et al. Tracheostomy in the COVID-19 era: global and multidisciplinary guidance. *Lancet Respir Med* 2020; **8**(07):717–725. Doi: 10.1016/S2213-2600(20)30230-7
- Liew MF, Siow WT, MacLaren G, See KC. Preparing for COVID-19: early experience from an intensive care unit in Singapore. *Crit Care* 2020 Mar 9; **24**(01):83. Doi: 10.1186/s13054-020-2814-x
- Chee VW, Khoo ML, Lee SF, Lai YC, Chin NM. Infection control measures for operative procedures in severe acute respiratory syndrome-related patients. *Anesthesiology* 2004; **100**(06):1394–1398. Doi: 10.1097/00000542-200406000-00010
- Repici A, Maselli R, Colombo M, et al. Coronavirus (COVID-19) outbreak: what the department of endoscopy should know. *Gastrointest Endosc* 2020; **S0016-5107**(20):30245–5. Doi: 10.1016/j.gie.2020.03.019
- Yáñez Benítez C, Güemes A, Aranda J, et al. International Cooperation Group on PPE and Emergency Surgery. Impact of Personal Protective Equipment on Surgical Performance During the COVID-19 Pandemic. *World J Surg* 2020; **44**(09):2842–2847. Doi: 10.1007/s00268-020-05648-2
- Zou L, Ruan F, Huang M, et al. SARS-CoV-2 Viral Load in Upper Respiratory Specimens of Infected Patients. *N Engl J Med* 2020; **382**(12):1177–1179. Doi: 10.1056/nejmc2001737
- Ambulkar RP, Singh P, Divatia J. Surgical safety checklist in the COVID era. *J Anaesthesiol Clin Pharmacol* 2020; **36**(03):289–290 <https://www.joacp.org/text.asp?2020/36/3/289/298279>
- Mishra P, Jedge P, Kaushik M, Artham P, Kumari S. Our Experience of Tracheostomy in COVID-19 Patients. *Indian J Otolaryngol Head Neck Surg* 2020 Aug 10; **1–4**. Doi: 10.1007/s12070-020-02036-z