Endoscopy in Otorhinolaryngology During Corona Outbreak: A Proposal for Safe Practice

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Received: 15 May 2020 / Accepted: 8 August 2020 / Published online: 13 August 2020
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Abstract Coronavirus disease 2019 (COVID-19) is a type of viral pneumonia that has paralysed the entire world both in terms of health and economy. It has been recently declared as a global pandemic. All the health care professionals must be aware of the disease entity and take precautionary measures to control its transmission from person to person, particularly in hospital settings. In this article, we propose essential steps that can be implemented at the departmental and institutional levels to do endoscopic diagnostic procedures effectively during COVID-19 outbreak and to break the transmission chain.

Keywords Endoscopy · Covid-19 · SARS-nCoV-2 · Personal protection equipment · Standard operating protocol

Introduction

Coronavirus disease 2019 (COVID-19) is a type of viral pneumonia caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Multiple cases of pneumonia from an unknown origin came into light from Wuhan, China, and were notified to the World Health Organization (WHO) on December 31, 2019 [1]. On January 7, 2020, the 2019 novel coronavirus (2019-nCoV) was identified as the cause of these reported cases. Later, the virus was renamed severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2]. The outbreak was subsequently named coronavirus disease (COVID-19) [2].

In the past five months, coronavirus disease 2019 (COVID-19), has been rapidly disseminated throughout India and the rest of the world [1]. It took WHO just three months to declare COVID-19 as pandemic (on March 11 2020), and by May 13, 2020, the number of confirmed COVID-19 cases had increased to more than 42 lakhs globally [2]. A large number of asymptomatic patients is also an important concern for health care workers. As we all know, endoscopy is an aerosol-generating procedure. Coughing and sneezing during endoscopic procedures could pose a risk of generating aerosols and increase the risk of SARS-CoV-2 transmission. Healthcare workers of Otorhinolaryngology, therefore, are facing tremendous threat doing routine endoscopies. Previous studies during the 2003 SARS outbreak showed that aerosols from patients could reach people located two metres or more from the source [3]. This article highlights that risk management protocols should be developed for doing routine endoscopic procedures in Otorhinolaryngology. The statements extracted from this article should be considered as a framework of safe and healthy clinical practice so as protect our frontline warriors during this pandemic.

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COVID-19

The China Health Authority reported to the World Health Organization (WHO) about several cases of viral pneumonia of unknown aetiology in Wuhan City in central China on December 31, 2019. This coronavirus was later renamed as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) by the Coronavirus Study Group [4]. This disease was also named coronavirus disease 2019 (COVID-19) by the WHO.

SARS-CoV-2 belongs to the family Coronaviridae and order Nidovirales. Two subfamilies in Coronaviridae are Coronavirinae and Torovirinae. The members of the subfamily Coronavirinae are subdivided into four genera: (a) Alphacoronavirus (b) Betacoronavirus (c) Gamma-coronavirus (d) Deltacoronavirus [5]. SARS-CoV-2 belongs to Betacoronavirus together with two highly pathogenic viruses, SARS-CoV and MERS-CoV. SARS-CoV-2 is an enveloped and positive-sense single-stranded RNA (+ ssRNA) virus [6]. Clusters of infected family members and medical workers have confirmed the presence of person-to-person transmission [7]. Person-to-person transmission is thought to occur among close contacts mainly via respiratory droplets produced when an infected person coughs or sneezes, which is very common in endoscopic procedures in Otorhinolaryngology.

Protection of Health Care Workers and Patients

Policy regarding screening and management of individuals with suspicion of COVID-19 seems to be varying regionally and is evolving rapidly. The following steps are our suggestions to protect ourselves and our patients:

- Universal precautions should be adopted during the endoscopic procedure in suspected/ confirmed patients. Health care workers should use Personal protection equipment: N95 mask, goggles and gloves are essential tools to save Health care workers (HCW).
- Screen and isolate patients who report symptoms similar to COVID-19 infection and refer them to a particular facility dealing with suspected COVID-19 patients.
- Delay or postpone elective, nonemergency endoscopic procedures, particularly during this peak of the disease. ENT department, along with its hospital and respective national bodies, should develop its guidelines on what constitutes elective procedures.
- Any HCW who has a history of travel to regions where local transmission of COVID-19 is reported should be encouraged to self-quarantine themselves for 14 days

even if asymptomatic and also be instructed to report to the COVID-19 facility if symptoms arise.

- Institutional infection control policy and recommendations of local governmental authorities, where applicable, should be strictly adhered to.
- HCWs are potential carriers of infection to people at their homes. Once back from work, special care needs to be taken to reduce contact with any articles or surfaces. Health care workers should adopt the habit of frequent hand washing, and the use of sanitisers should be adopted. During entry and exit from the hospital premises, hospital clothes should be preferably changed. A shower is advised before coming in contact with any family member. Materials carried to the hospital, such as laptops and pens, maybe stowed separately in a safe place.
- Home quarantine for any suspicious symptoms is essential. Unlike a few other pandemics which happened before, COVID-19 sheds infective virus a few days before the onset of symptoms. Thus, voluntary quarantine if mildly symptomatic or after contact with a symptomatic patient (if not wearing proper PPE) is essential.

Protection of Staff and Personnel in the Endoscopy Room [8–13]

These are as follows:

Consider postponing elective endoscopic procedures for a few days to weeks.

- Reduce the number of staff in the endoscopy room to one.
- Staff should be familiar with the appropriate donning and doffing procedure.
- Need to have separate donning and doffing spaces.
- Staff should be familiar with the equipment and appropriate functioning of equipment.
- Designated staff will maintain a distance of at least 6 feet from the patient during the procedure, with a minimum of N95 mask, goggles/ face shields.
- Avoid sneezing/coughing of the patient by adequately anaesthetising patients nose with pledgets soaked in 4% lignocaine and vasoconstrictor.
- To use smaller diameter endoscope to avoid irritation to the mucosa.
- Reduce the number of endoscopies per day. Do endoscopies if only indicated.
- Cleaning of the endoscope, camera system, equipment and surfaces of endoscopy room with hypochlorite/ alcohol swabs after each endoscopy.
- Try to do endoscopies in negative pressure rooms.

- For COVID positive patient A powered air purifier respirator can be used instead of N95 mask. In view of the recent case report, in which doctors wearing PPE with N95 mask while a skull base procedure got infected, while anaesthesiologist using PAPR was spared, at Wuhan.
- The doctor performing the endoscopy should use video aided endoscopy with facility for recording for future assessment, to reduce the number of attempts and follow up.
- The doctor performing the procedure should wear a minimum of a fluid resistant gown with an N95 mask, face shield, hair protection and boot protection.
- Good surface cleaning of the equipment and room surfaces should be performed after every procedure using a chlorine-based disinfectant.
- Deep cleaning and fumigation of the room should be performed when a reverse transcriptase-polymerase chain reaction COVID-19 positive patient undergoes a procedure. In our institution, 1% solution of sodium hypochlorite is used for final cleaning of floors, walls, and high-touch surfaces, and 70% isopropyl alcohol is used for equipment disinfection in addition to 3% glutaraldehyde.
- Use disposable plastic covers over the camera cables.
- Screen all patients undergoing the procedure for fever, respiratory symptoms, and travel history. All patients with respiratory symptoms should be made to wear a surgical mask before transfer to the IR suite.
- When possible, procedures on COVID-19 suspect/positive patients should be performed as the last procedure, and the endoscopy room should be thoroughly ventilated for at least 1 h before the next procedure by using blowers or natural ventilation.
- Doctors/ endoscopy assistants should be trained in donning and doffing of PPE. A dedicated area should be earmarked for wearing of PPE before entering the endoscopy room.
- Appropriate PPE (disposable waterproof gowns, N95 or higher-order respirator, eye protection such as goggles or visor mask) should be used when performing these procedures.
- Minimise the number of HCWs in the procedure room when performing a procedure on COVID-19 positive patients.
- Recorded videos/Live video demonstration may be used for training residents/interns rather than allowing them in endoscopy room.
- On March 22, 2020, Indian Council for Medical Research (ICMR) has recommended hydroxychloroquine (HCQ) for chemoprophylaxis of COVID-19 among asymptomatic HCWs. ICMR recommends a dose of 400 mg twice a day on day 1, followed by

400 mg once weekly for the next seven weeks is recommended.(13) At the moment, large randomised control trials supporting the use of HCQ prophylaxis is lacking. In this regard, it is suggested that individual caution should be exercised and suggestions of a physician with experience in using HCQ be sought.

Endoscopic Services During a Pandemic

There is no clear consensus on which procedures should be done and which should not be done during the pandemic. Most of the guidelines recommend postponing all endoscopy. However, endoscopies with aid in diagnosis and management cannot be ignored as the pandemic may stay for a longer time.

Endoscopies in Otorhinolaryngology can be categorised as,

Urgent.

Non-urgent-can perform.

Non-urgent-can postpone.

Urgent procedures include nasal endoscopies for foreign body removal, and epistaxis management can be considered.

All diagnostic endoscopies can be considered as non-urgent. Appropriate imaging can be done before endoscopy, especially in nasal, nasopharyngeal, oropharyngeal or larynx lesions. Endoscopy can be considered in such lesions while considering for biopsy. In cases of malignancies, endoscopies can be performed after appropriate imaging.

Endoscopies for non-urgent conditions like allergic rhinitis, chronic sinusitis, nasal polyposis and laryngopharyngeal reflux diseases can be delayed (consider after a course of medical management). However, the urgency of the endoscopy can be decided after consulting a senior consultant. A team can be made within the department, including the senior consultants, whose approval will be needed for considering the patient for endoscopy. As per ENT UK guidelines, an airway team has been designated for the safe conduct of tracheostomy [8]. We propose an endoscopy team in similar lines for the safe conduct of endoscopies in Otorhinolaryngology. The team will assure the conduct of safe endoscopies in this pandemic. We propose a Standard operating protocol (Fig. 1).

We can use a silicone face mask (used along with Artificial Manual Breathing Unit (AMBU)/Continuous Positive pressure ventilation(CPAP)) sealed over the patient's face with straps along with an adapter (Fig. 2). Another way we propose, if silicone masks are not available, is that the patient can wear a normal mask with a

Fig. 1 Proposed standard operating protocol for endoscopy procedures

Standard operating Procedure for Endoscopy in COVID-19 Era

Team- Two senior consultants, Endoscopy room staff, Institution Infection control committee member

- Approval of indication by both senior consultants
- Assurance of safety precautions, appropriate Donning and doffing areas
- Assurance of Quality of all equipment.
- Assurance of safe practices while endoscopy.
- Assurance of appropriate disinfection practices

Triage

Screen for Covid-19 infection

1. Any history of cough or fever or shortness of breath and history of travel in past 14 days?
 2. Any history of cough or fever or shortness of breath with contact with a lab confirmed case?
 3. Any history of cough or fever or shortness of breath and being a health care worker working at Covid designated area?
 4. Any history of severe acute respiratory illness?
 5. Any history of contact with a confirmed case
 6. Are you coming from a hotspot/cluster area/large migration/evacuee centres?
- a) If any of the one above is positive consider for RT PCR prior endoscopy if indication
 - b) Approval for indication for endoscopy by the endoscopy team
 - c) May consider to postpone if any of the symptoms are positive after 14 days and reassess for symptoms before endoscopy
 - d) Screen the temperature prior to procedure

Procedure area

- Three rooms required
 - Entry through first room for Donning.
 - Second room procedure room.
 - Exit through third room Doffing.
- Rooms should be preferably with negative ventilation.
- Distancing between patient, doctor and staff should be at least 6 feet.
- All patients to be given mask before endoscopy.
- Appropriate donning and doffing measures with buddy check
- Consenting can be done verbal consenting or video consenting preferably
- Consider to reduce the number of people in the procedure room.
- Video recordings can be taken which can be used for future assessment and for educational purposes for trainees. However consent should be obtained from patient for the same

Procedure related measure

- Consider for Local anaesthesia with nasal pledgets (4 %lignocaine with vasoconstrictor solution) prior to nasal endoscopy.
- Viscous Lignocaine solution for laryngeal examination.
- Consider to use a size smaller endoscope for comfortable endoscopy preferably flexible
- Consider oxygen mask (NIV) or fish valve containing mask for all endoscopy and minimize accessory device passage.

Personal Protection Equipment

- N95 mask for all endoscopies
- PAPR preferred if available for known Covid19 positive patients
- Fluid resistant gown, face shield, Hair cover and boot cover

Equipment and room disinfections

- Disinfection procedure to be done after each endoscopy
- Metal Surfaces to be cleaned with 70% alcohol swab
- Other equipment and surfaces to be cleaned with 1% hypochlorite

small hole close to the nostril. A plastic tube can be used to fit within the whole which can allow the smooth passage of flexible scope (Fig. 3).

Risk of endoscopic procedures like direct nasal endoscopies, rigid video laryngoscopies and flexible laryngoscopy, has not been well studied [13]. Objectively, during endoscopies, the patient may gag, cough, retch, and

sneeze, which carries a risk for aerosolization. Practices around the world are mainly based on experiences at Wuhan [14]. World Endoscopy Organisation, British Society of Gastroenterology and Safe Airway Society suggest to do all aerosol-generating procedures with PPE [15]. Patient discomfort should be reduced by appropriate local anaesthesia.

Fig. 2 Performing flexible fibreoptic laryngoscopy with a silicone face oxygen mask strapped around the patient's head to get a proper seal with the adapter shown in inset image

Fig. 3 Performing flexible fibreoptic laryngoscopy with via a tube attached to the hole in surgical mask. Inset image showing the tube (syringe with cut open proximal and distal ends)

Conclusion

Endoscopy is critical in the diagnosis and management of many ailments in Otorhinolaryngology. We have to find an effective solution for conducting endoscopies safely

without transmitting infections to health workers and other health workers. Even though many centres recommend to discourage endoscopies, in the long term to reduce the morbidity, mortality and for early diagnosis of otorhinolaryngology illnesses, we have to find ways to perform safe endoscopies in COVID pandemic. Safe practices will not only help health care workers to not contract the infection but also to avoid transmitting the disease. Safe endoscopy practices can help to prevent the transmission of COVID19. It is necessary to adapt clear plans and standard operating procedures to ensure the protection of health care workers and patients.

Author's Contribution DK: a. Conceptualization, b. Drafting the article, c. Screening articles for inclusion in review article, d. Writing-Review and editing, e. Validation. NPN: a. Writing—original drafting, b. Data Curation-Helped in literature search and collecting articles, c. Helped in screening articles for inclusion in article, d. Validation. KS: a. Data Curation-Helped in literature search and collecting articles, b. Helped in screening articles for inclusion in article, c. Writing-Review and Editing, d. Validation. AG: a. Helped in literature search and collecting articles, b. Helped in screening articles for inclusion in article, c. Validation. BC: a. Helped in screening articles for inclusion in article, b. Validation. NR: a. Data Curation-Helped in screening articles, b. Validation, c. Collected clinical photographs.

Funding There was no funding involved in this.

Data Availability Any relevant data/information regarding the proposal will be available on request.

Code Availability Not applicable.

Compliance with Ethical Standards

Conflict of interest There is no conflict of interests among authors.

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