

## OTOLARYNGOLOGY AND COVID-19: NAVIGATING A MINEFIELD

Shoaib Ahmed

Combined Military Hospital/National University of Medical Sciences (NUMS) Rawalpindi Pakistan

### ABSTRACT

**Importance:** COVID-19 has infected ENT specialists disproportionately during the pandemic. Hence their protection is vital. Recommendations from major treatment centres and international health organizations suggest proper protective measures, continual awareness and restricted surgical procedures and training.

**Objective:** To review evidence of implementation of safe clinical practices, triage of surgical procedures and changes to departmental and academic activities.

**Evidence Review:** A comprehensive review of literature was performed on 15<sup>th</sup> June 2020 using the PubMed database using the terms "COVID-19", "SARS-CoV2" together with "otolaryngology", "clinical practice guidelines", "emergency procedures" and "training". All research studies in English language were included which addressed changes to otolaryngology practices and training of residents in COVID-19 pandemic. The main outcome measures were guidelines for safety of ENT teams and residents with prioritization of surgical procedures and restricted academic activities.

**Findings:** The search queries identified 31 articles for review out of which 5 were selected for full text systematic review. Individual guidelines and practices from major University hospitals and academic ENT organizations/ societies were reviewed.

**Conclusions and Relevance:** Major gaps in current research knowledge preclude definite conclusions about departmental practices. However, use of recommended preventive measures, personal protective equipment and suspending elective surgical procedures appear to reduce the risk of transmission. General principles of social distancing, hand sanitization and wearing mask remain very relevant.

**Keywords:** Clinical practice guidelines, COVID-19, Emergency procedures, Otolaryngology, SARS CoV-2.

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### INTRODUCTION

At the end of 2019 in Wuhan, China a novel corona virus led to a rapidly spreading respiratory disease, designated as COVID-19 by World Health Organization (WHO). The highly contagious nature of the virus results from respiratory droplets shed in coughing, sneezing, talking by an infected person. Close contact with a COVID-19 patient or direct contact with contaminated surfaces are also recognized sources of infection<sup>1</sup>. The virus remains viable in aerosols for 3 hours and up to 72 hours on plastic and stainless steel. Aerosolization, a process during which small particles are generated and dispersed in the air, is the major source of SARS CoV-2 infection at ENT units<sup>2</sup>. The incubation period for COVID-19 extends up to 14 days, during which the patient can readily infect others while being symptom free. Such patients constitute a major reason for the explosive spread of this disease

everywhere. During the early phases of outbreak it was observed that the highest rates of nosocomial transmission occurred in ENT specialists. This was largely explained by widespread viral involvement of upper respiratory tract mucosa and the close contact that ENT specialists need to maintain while examining patients<sup>3,4</sup>.

Hence, a radical reorganization of all dimensions of ENT care has been considered essential which is the focus of this review. Incorporation of these major changes have been considered critical to protect patients and staff while ensuring optimal emergency care.

### METHODOLOGY

A comprehensive literature review was performed on 15 June 2020 using the PubMed database (from January 2020 onwards). The primary objective was to determine specific risks to ENT teams and their personal protection. Secondary objectives were to determine the risks associated with invasive procedures, their prioritization together with altered academic activities. Special

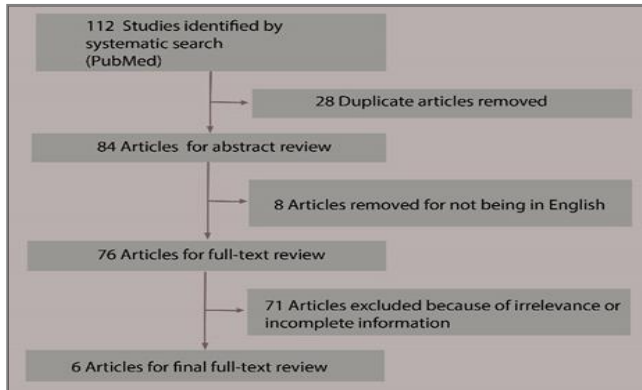
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**Correspondence:** Dr Shoaib Ahmed, Dept of Otolaryngology Head & Neck Surgery, CMH Rawalpindi Pakistan

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emphasis was placed on safe practices in tracheostomy. Search criteria included all occurrences in the title or abstract of the terms “COVID-19”, “SARS-CoV2”, “otolaryngology”, “clinical practice guidelines”, “emergency procedures” and “training”. There being few studies on the relevant subject, a search was also made at Elsevier and Science Direct websites.

The eligibility assessment of search data was



**Figure-1: Flow diagram showing systematic search in line with inclusion and exclusion criteria.**

done in a standardized manner (fig-1). Duplicate articles were removed. The abstract of each citation was screened for relevance to safe otolaryngology practice in COVID-19. Irrelevant articles and those not in English were excluded. A total of five studies meeting the eligibility criteria were finally included in the full text review (table).

## DISCUSSION

This systematic review demonstrates safe practices and recommendations for ENT work in COVID-19 from several major academic centres<sup>2,8,25-27</sup>. Since the disease has turned into a pandemic in a short span and is spreading at a frightening speed, all clinical practice guidelines are being regularly updated.

Since the main reservoir of the virus is in upper respiratory tract mucosa<sup>1,30</sup>. ENT specialists are at greatest risk of infection. This has been tragically demonstrated when the first physician death from COVID-19 was an ENT specialist<sup>3,4</sup>. Hence few specialities have been so drastically affected in this pandemic as otolaryngology. Suspension of all elective procedures, individualized decision making for cancers, establishment of telemedicine clinics

and protection of health care workers have been the global hallmark of otolaryngologic practice. Unique challenges related to relentless exposure to viral loads as well as potential hazards arise on a daily basis in this rapidly evolving pandemic. Meaningful data from global research efforts helps to direct diagnosis, management protocols and improved care of afflicted patients. Certain innovative practices and out of box solutions help to offer some measure of training of residents.

## Infection Control

The primary method of transmission occurs from droplet spread, where large droplets carry the virus particles. Aerosolisation occurs in certain specific airway maneuvers, called aerosol generating procedures where the virus is widely spread in the air and surfaces. ENT specialists are exposed to most of these procedures and are hence at enormous risk. Such procedures include nasal endoscopy, laryngoscopy, bronchoscopy, tracheostomy, high flow nasal cannula, mastoid drilling, nasal cauterization and nebulizer treatments<sup>3-5</sup>. Use of personal protective equipment (PPE) is known to be effective in reducing the risk of such nosocomial infections. Centre for Disease Control and Prevention (CDC) and WHO recommend wearing at least gown, gloves and N95 mask. Where very high risk exposure is anticipated an N95 respirator mask or a powered air purifying respirator (PARP) is required<sup>6</sup>. Contaminated surfaces need to be diligently wiped/sprayed with diluted bleach, 70% alcohol, hydrogen peroxide or quarternary ammonium compounds<sup>7</sup>.

## Changes to Out Patient Departmental Activities

At this department, the main objective has been to provide the highest quality of care in emergency conditions while minimizing risk to all health care personnel and conserving critical resources like PPE. Following precautionary practices were adopted:

1. Routine ENT examinations were cancelled and a remote well staffed Tele Medicine clinic established. It was efficiently utilized to facilitate consultations, identifying patients requiring urgent procedures/clinical review and reduce the number of patients visiting the hospital. This approach has been supported by

ENTUK and some private hospitals at Karachi. It is believed that Tele Medicine will stay even in the post COVID-19 world.

2. Large information panels and running videos on large screens were prominently displayed emphasizing the importance of social distancing, wearing masks and hand washing.
3. Numerous changes were made to waiting areas to prevent viral spread. The main waiting area was moved close to the main entry and exit of department to reduce patient movement. Patients were seated at a distance from each other to ensure reasonable social distancing at all times. To avoid crowding attendants were allowed only with handicapped patients and waiting times reduced to minimal.
4. To avoid contamination of multiple clinics and the entire department a single consultant clinic adjacent to the main entry area was earmarked for all clinical assessments. After each consultation, surfaces and seating areas of the clinic were sanitized with alcohol based solutions and aerosol sprays done.
5. Flexible laryngoscopy was limited only when absolutely necessary followed by high level disinfection of all the equipment used. Ane-gative preliminary PCR for SARS CoV-2 was mandatory before each procedure.

#### Protection of Health Care Workers

1. To preserve a pool of healthy doctors, all the Consultants and residents were divided into two teams which were rotated weekly. This helped to reduce individual exposure while ensuring patient care. This practice is followed in several countries<sup>8,9</sup>.
2. Wearing of surgical masks/N95 masks were considered mandatory by all tiers of hospital staff which were routinely issued on weekly basis. Since all patients presenting for examination had an unknown COVID-19 status minimal PPE was provided to all the staff (fig-2) as per international recommendations. These have proved to be effective in protection against respiratory infections<sup>5,9</sup>. In high risk situations, N95 respirator masks with H3 filters were also provided (fig-3).

3. Regular video sessions and Hands on work-shops on donning and doffing of PPE were regularly held and facilitated by staff from National Institute of Health. This training is important, as one series has demonstrated 79% of staff self contaminated while removing PPE<sup>10</sup>.
4. All the staff were regularly advised to monitor their own health & exposure especially when high risk encounters occur. A low threshold was

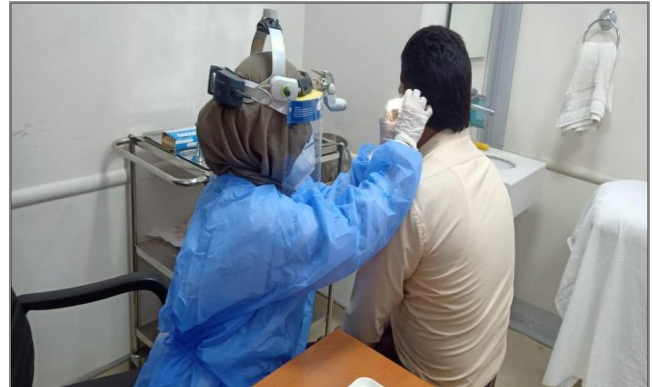


Figure-2: Patient examination in the emergency clinic with basic PPE.



Figure-3: N95 respirator mask with filters for high risk situations.



Figure-4: Academic clinical session with residents in COVID-19 environment.

maintained for quarantine and PCR for COVID-19. Regular daily interactions and a morning brief involving all available consultants and residents maintained a spirit of camaraderie in the department. They also helped in identifying new problems, implementing timely measures as well as allaying any "health anxiety" which is inevitable with increasing viral exposure, social isolation and witnessing patient mortality<sup>10,11</sup>.

### Triage of Surgical Procedures

A broad outline of prioritization of surgical procedures has been developed (table-I) to clarify indications, ensure timely surgery, conserve resources and protect staff from unnecessary exposure.

**Table: Description of otolaryngology practices & recommendations in COVID-19.**

Source	Journal	Type of Study
Bernardi <i>et al</i> , 2020	The Laryngoscope	Retrospective review
Vukkadala <i>et al</i> , 2020	The Laryngoscope	Contemporary review
Kowalski <i>et al</i> , 2020	Head & Neck	Review article / Special issue
Krajewska <i>et al</i> , 2020	Auris Nasus Larynx	Prospective review
Krajewska <i>et al</i> , 2020	European Archives of Otorhinolaryngology	Systematic review

*A total of 5 articles were included for final review*

Basically it involves avoiding all AGPs which pose enormous risk to health care workers<sup>10</sup>.

### Tracheostomy: Prioritization And Decision Making

A small proportion of patients with COVID-19 require mechanical ventilation. At some point, tracheostomy is considered in these patients<sup>11-13</sup>. However, being a major AGP with enormous risk to those present, certain broad recommendations have been implemented:

Tracheostomy is reserved for selected patients, preferably in those with good prognosis, few comorbidities and favourable chances of recovery. Here, it should be considered only after at least 14 to 21 days of endotracheal intubation. Exceptions include, problems in tracheobronchial suction and/or endotracheal tube blockage (ETT). It should always be done under GA and by senior surgeons only with a minimum number of operation theatre staff.

Some, modifications in steps that are recommended are important:

- Ideally, a negative pressure operation theatre should be used. If that is not feasible, trache-

ostomy should be scheduled at the end of the list.

- Immediately before the tracheal incision, the ETT is inserted deeper with the tip just above the carina.
- Ventilation needs to be briefly interrupted (upto 15 seconds) at the time of tracheal incision and during tracheostomy tube insertion.
- Every made should be made not to damage the cuff of ETT.
- The tracheostomy tube cuff should be immediately inflated, connected to the ventilatory circuit and no surgical dressing/absorbent pad

placed under the tube.

- A cuffed non fenestrated tracheostomy tube should be maintained throughout the care of the patient.
- The first tube change should be considered after 14 days.
- A heat & moisture exchange filter should be applied in case of discontinuation of the ventilatory circuit<sup>14-19</sup>.
- Tracheostomy cuff to remain inflated and periodically checked for leaks.
- A decannulation trial should be postponed till the patient is COVID-19 negative.

### Patients with Head and Neck Cancer

These patients are at high risk of severe symptoms as a result of exposure to SARS CoV-2. A consensus for management of these patients has been reached<sup>18,19</sup>:

Timely endoscopy and biopsy (table-I) under GA for exact tumour staging and tissue diagnosis.

Individualized and limited MDT with oncologists and reconstructive surgeons to decide on definitive management.

All patients with laryngeal cancer are advised radiation therapy and maintained on follow up for disease control / recurrence. Any laryngectomy /transoral resections are deferred till control of COVID-19 pandemic<sup>20,21</sup>.

### Endoscopic Sinus Surgery Procedures

All of these procedures are highly aerosol generating as the viral load is highest in nasal mucosa. Use of powered instruments, suction, saline irrigations and cleaning of endoscopes during surgery also contribute to aerosolization<sup>8,22-24</sup>. This poses particular risks to surgeons. Surgery is restricted to control orbital/intracranial spread of infection, preserve vision and tissue debridement in mucormycosis. All other elective procedures are postponed<sup>25-28</sup>.

### Training and Academic Activities

Training in surgical specialities has been severely compromised in COVID-19 particularly in areas where surgical skills is concerned. At some centres, educational activities are being conducted on online meeting softwares<sup>28</sup>. To continue with training in this challenging environment, certain improvisations and out of box solutions have been employed at this department:

Small group sessions with residents, centered on patient care (fig-4). Particular emphasis is placed on real clinical scenarios and management of unexpected crises and challenges in surgery. Journal club meetings were also incorporated into these sessions.

These daily 90 minutes of sessions ensured continuation of training with active participation of residents and helped to achieve the goalposts of postgraduate curriculum. A regular log was also maintained to streamline these academic sessions.

These were complemented with weekly online image challenges for residents presented in a question format at C3 level to prepare for the FCPS-II examination.

### CONCLUSION

The COVID-19 pandemic is a raging global health emergency. The number of infected patients continues to rise with more than half a million deaths worldwide and rising<sup>29</sup>. New challenges are emerging as pathophysiology and clinical manage-

ment are better clarified in this dynamic situation. Enormous amounts of research data and clinical standards are daily updated. The need for international cooperation has never been felt more greatly<sup>30</sup>.

Clinical leaders in otolaryngology have a responsibility to protect their teams, radically review all departmental activities and surgical practices and continue with whatever training that can be safely be carried out in these challenging times<sup>31</sup>. This discussion emphasizes the essential aspects of COVID-19 related to otolaryngology. This may serve as a central resource for health care administrators, planners in government and leaders in medicine to combat this relentless viral outbreak.

The bottom line remains that ENT specialists should not let their commitment to clinical care override their own safety, as health care workers are the most critical resource in a pandemic for any country.

“The more strategic you are , the more spontaneous you can be.”

(Keith A Craft- Book on Leadershipology)

Table-I Planned prioritization of surgical procedures based on defined timelines

#### a) Emergency (24hrs)

- 1) Tracheostomy for upper airway obstruction
- 2) Incision drainage for deep neck space abscesses
- 3) Control of post tonsillectomy & other catastrophic hemorrhage
- 4) Endoscopic management of severe acute anterior and/or posterior epistaxis
- 5) Management of laryngeal trauma with compromised airway
- 6) Pediatric airway FB removal (those with stridor / unstable airway)
- 7) Exploration for penetrating neck trauma
- 8) Management of retrobulbar hematoma / optic nerve decompression
- 9) Debridement for acute invasive fungal rhinosinusitis & necrotizing fasciitis
- 10) Removal of high risk esophageal FB

#### b) Urgent (up to 72 hrs)

- 1) Surgical correction of complications from acute or chronic otitis media
- 2) Drainage of post operative hematomas with stable airway
- 3) Definitive surgery for choanal atresia
- 4) Drainage of hematoma or abscess of nasal septum
- 5) Pediatric airway FB removal (with stable airway)
- 6) Uncomplicated esophageal FB
- 7) FESS for sinusitis with impending/evolving complications

### c) Planned (up to 1 month)

- 1) Elective tracheostomy
- 2) Cervical lymph node biopsy for suspected lymphoma
- 3) Rigid endoscopy and biopsy for likely malignant lesions
- 4) Oncologic resections decided on MDT

### CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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