Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Revisiting Otology in Covid Times: Our Experience

Dr Abha kumari (abhak12@gmail.com)
COMMAND HOSPITAL(SOUTHERN COMMAND) , PUNE, INDIA

2. Dr Uma Patnaik
COMMAND HOSPITAL(SOUTHERN COMMAND) , PUNE, INDIA

3. Dr Gunjan Dwivedi
COMMAND HOSPITAL(SOUTHERN COMMAND) , PUNE, INDIA

4. Dr Amit Sood
COMMAND HOSPITAL(SOUTHERN COMMAND) , PUNE, INDIA

Case Report

Keywords: COVID19, SARS -CoV-2 Otology practice, Ear surgery

Posted Date: September 22nd, 2020

DOI: https://doi.org/10.21203/rs.3.rs-64970/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Abstract

BACKGROUND: The health care providers remain committed to the patients amid the unprecedented corona virus disease 2019 (COVID-19) pandemic despite significant increased risk of viral transmission. The consequent increased risk of transmission to health care professional is a major concern and warrants necessary precautions to curtail it. Strict adherence to the protective measures with consequent safeguarding of the health care workforce is of paramount importance for the continued optimal medical care provision to the community.

OBJECTIVE: To describe as to how the COVID-19 pandemic has changed Otology practice in the current scenario and to highlight the pragmatic and optimal protective measures exercised to minimize risk of viral transmission based on our experience at tertiary otolaryngology centre in Armed forces.

METHODS: Here we present a series of six otology cases who underwent surgery at our centre during COVID-19 pandemic with a special emphasis on the optimal protective measures undertaken.

CONCLUSIONS: The combined effect of inherent nature of otolaryngologist work and respiratory droplets being the major source of transmission puts the otolaryngologist at an even greater risk of contracting infection than other health care workers. Although, it has become challenging to practice otolaryngology during the current pandemic, a strict adherence to the recommendations can significantly curtail the risk of transmission. At our centre we followed a strict protocol based on the available guidelines and could achieve non-transmission of virus to both the patients and health care providers.

Introduction

The reports of mysterious cases of pneumonia emerged from Wuhan city, Hubei province, China in December 2019.The causative agent was initially identified as a new corona virus (2019-nCoV), later named as corona virus disease 2019 (COVID-19) by the WHO, is considered to be a new zoonotic disease (suspected to derive from enzootic bat viruses) which primarily inflicts the respiratory system. Over last few months, the virus has spread extensively across the globe with consequent declaration of the disease as a pandemic by WHO on 11 March 2020 [1]. The rapidity of spread and the high risk of virus transmission has posed significant challenge to the existent global healthcare system. 3.8% of all COVID-19 cases in China were noted among the health care workers, of which 14.8% had severe disease [2]. As on 14 August 2020, the total cases and deaths attributable to COVID 19 in India has risen to 2.4 million and 48,000 respectively (3). The causative virus mainly resides in the airway with documented high viral load in the oral and nasal cavities and consequent affection of the respiratory mucosa, lining of middle ear, mastoid and Eustachian tubes [4-6]. Due to the preferred affliction of the respiratory mucosa by the virus, the risk of transmission to the otolaryngologist is increased many fold, during both the diagnostic and therapeutic procedures undertaken for patients infected with COVID-19.The asymptomatic but infected individuals pose a unique challenge to clinicians, warranting optimal precautions during clinical examination. Reports from China and Italy have documented increased rates

of infection among the otolaryngologists, providing health care, plausible explanation being the variety of aerosol generating procedures being frequently undertaken (both out patient and admitted cases) by the otolaryngologists [7-9]. Aerosol generating procedures include endoscopies, mastoid drill and other surgical procedures such as tracheostomy, endonasal and skull base surgeries [10-13]. Use of high powered drill during surgeries produce aerosol particles with higher potential to transmit infection[13-15]. Due to the continuity of middle ear and mastoid with the airway; this risk further increases. Studies available on literature search , documenting effects of COVID-19 on otolaryngology practice and recommendations for reducing transmission are at the best scarce [16-20]. *To the best of our knowledge no Indian study/publication is available in the literature, documenting ear surgeries amid COVID pandemic*. Here, we present our experience of a few emergency ear surgeries undertaken with optimal precautions during this pandemic at our tertiary care otorhinolaryngology centre.

Methods

Study designs and participants

This case series was conducted at a tertiary care hospital after obtaining consent from patients and approval by the ethical committee. The otorhinolaryngology practice has markedly changed during COVID-19 pandemic. Ear surgery carries a high risk of infection due to aerosol generating procedures. Measures to minimize the viral transmission risk were implemented at all levels.

Patient selection

Otolaryngology health care providers were consulted for tracheostomy, epistaxis, foreign body removal, ear surgery with complications and the head and neck malignancies which required urgent attention and intervention. The details of patients who underwent surgical procedure at our centre between April to July 2020 were reviewed. During this period we undertook six cases of emergency ear surgeries. The three of the six cases involved mastoid drilling(as part of the mastoid surgery) and the rest were managed for a foreign body in the ear. Here we present briefly, the cases done at our tertiary centre strictly following the MOHFW (Ministry of health and family welfare, Government of India) guidelines, with appropriate personal protective equipment (PPE) , which includes cover all gown (impermeable gown), N95 mask, gloves, goggles and face shield [20].

Case 1

68 year-old-male, a known case of chronic otitis media (mucosal) left ear with uncontrolled diabetes presented with complaints of pain and discharge involving left ear associated with deviation of tongue and absence of gag reflex on left side, suggestive of skull base osteomyelitis. He had undergone tympanoplasty for left ear four month prior at a civil hospital, however, he continued to have persistence of ear discharge. Because of the strict lockdown consequent to surge of COVID-19 cases, he could not seek timely medical attention. He reported to our hospital with persistence of symptoms. Examination revealed subperiosteal abscess (mastoid region), edematous ear canal (with granulations) , ipsilateral

hypoglossal nerve palsy (Fig 1) and absence of the gag reflex. Rest of the otoneurological examination was unremarkable. Presurgical workup included obtaining pus culture swab (from EAC),baseline haematological investigations, COVID -19 status and imaging [high resolution computed tomography (HRCT) temporal bone and Magnetic resonance imaging (MRI) brain]. The patient was initially managed with aural toileting, strict glycemic control and appropriate antibiotics. The patient was taken up for surgery (cortical mastoidectomy and tympanoplasty) ensuring strict precautions with level 2 PPE, minimum number of health care providers inside operation theatre, one drape over the microscope and another drape around surgical area to prevent inadvertent mastoid bone particle dispersal (Fig 1). The patient became symptom free and the subsequent follow-up examination at two week post surgery demonstrated normal gag reflex with near complete resolution of hypoglossal nerve paralysis. He was given long term antibiotics with resultant complete resolution of disease.

CASE 2

38-year-old male, a known hypertensive presented with complaints of left ear fullness for fifteen days and diplopia of seven days duration with associated intermittent mild headache and no other ear complaints. There was past history of chronic serous otitis media (left ear) for which cortical mastoidectomy was undertaken three years back .

Examination revealed inflamed and bulging left tympanic membrane , Left lateral rectus palsy and moderate mixed hearing loss. HRCT temporal bone documented hypodense soft tissue attenuation contents in epitympanum and mastoid along with bony erosions at the petrous apex, suggestive of acute on chronic otomastoiditis left ear. Contrast enhanced MRI showed heterogenous enhancement in middle ear and mastoid along with diffuse enhancement and thickening of the dura, suggestive of pachymeningitis. He was assessed by multispeciality team including otolaryngologist, neurophysician, radiologist and endocrinologists. Work up excluded other differential such as meningitis, tuberculosis, autoimmune disease, IgG4 diseases and vasculitis. He was thus managed as a case of acute on chronic otitis media (left) with intracranial complication. Parentral antibiotics were initiated, and his symptoms of headache and diplopia resolved in a few days. He underwent revision cortical mastoidectomy with type I tympanoplasty left ear, with aim of surgery being to remove source of infection and to obtain representative tissue for HPE(Histopathological examination) . The HPE documented chronic nonspecific inflammatory cells with no bacterial, tubercular or fungal growth obtained. The patient recovered completely with no residual neurological deficit following six weeks of parentral antibiotics.

Case 3

A 72- year- old male presented with moderate intensity headache of one month duration. The clinical examination confirmed seventh, ninth, and tenth cranial nerve paralysis. Otoscopy showed normal external auditory canal and tympanic membrane. HRCT documented dependent soft tissue attenuation contents in the middle ear and mastoid, erosions in the region of central skull base with a demonstrable collection in retropharyngeal area , overall imaging features favoring skull base osteomyelitis. Patient

underwent nasal endoscopy ,retropharyngeal abscess drainage and cortical mastoidectomy under general anesthesia(GA). He was continued on parentral antibiotics and showed clinical improvement.

Case 4 to 6

We managed three cases of ear foreign bodies in children successfully in our outpatient department, taking strict preventive measures as use of a disposable gown, face shield and gloves to minimize risk of viral transmission.

Discussion

The increased risk of transmission to health care professional is a major concern and warrants necessary precautions to curtail it. Strict adherence to the protective measures with consequent safeguarding of the health care workforce is of paramount importance for the continued optimal medical care provision to the community.

During the initial days of pandemic, lack of adequate knowledge and awareness about the disease , resulted in transmission of infection to a large number of health care providers. With increasing awareness among the community, further data available through global network of clinicians, and consequent adoption of strict preventive measures has led to provision of medical care to patients with a relatively better safety profile to the health care workers.

Respiratory droplets being the major source of transmission, puts otolaryngologists at an even greater risk of contracting infection than other health care workers[4-6]. Due to inherent nature of work of otolaryngologists , there is high risk of exposure at all places; out patient department (OPD), emergency room, operation theatre and inpatient wards. So, health workers in the otolaryngology department should use standard precautions while handling patients. Specific guidelines have been issued by MOHFW for safe practice in otolaryngology in India [20]. In our tertiary care centre we adopted all strict precautions and succeeded in minimizing the risk of viral transmission. All of our six cases needed an urgent intervention in the form of biopsy, debridement, surgery or foreign body removal.

Amid COVID-19 pandemic, although we have postponed elective ear surgeries at our centre , we ensure that the best and optimal medical care is provided for emergencies. The cases are grouped into elective and emergent, following an evaluation telephonically (telemedicine) or clinical examination in the OPD. Here, we document our experience in providing emergent and optimal surgical care with strict adherence to preventive guidelines supplemented by a few pragmatic improvisations. Most of the ear surgeries require mastoid bone drilling and studies suggest that high powered mastoid drilling is associated with increased aerosol and small particles generation with the potential of transmission of COVID-19 virus [13-15].

A recent study done by Chen et al using a high speed drill simulated using fresh frozen mastoid of cadavers demonstrated increased dispersion of florescent particles to 360 degrees during mastoid

drilling , with particles density being maximum in proximity to the surgeon and the surgical site [10]. We used two drapes, one to cover the microscope and modified the second drape by making holes for working channel , covering patient and surgical field in a tent shape, thus minimising the dispersal of bone dust and aerosol particles as described by Hellier et al [21] .

Following recommendations are being followed in our department and patients are thus being managed safely:

1. **REAPPROPRIATION OF ENT CONVENANT**

- All patients are screened at Flu clinic as the proportion of patients presenting with cold and cough symptoms are much higher in number in the otolaryngology
- Patients approaching for teleconsultation are encouraged and a prior appointment for OPD consultation is provided to minimize risk of viral infection and restrict unnecessary entry inside OPD premises.
- All patients wear masks and use hand sanitizer before entering OPD premises , and are also counseled about the disease.
- In the waiting area, a distance of 2 meters among the patients is ensured to prevent viral transmission.
- Social distancing was strictly followed, one patient at one time was attended, and as far as pragmatically possible the attendants were not allowed to inadvertently enter inside the examination room.
- The health care provider in the consultation suite wears all protective gear including gown, gloves, goggles, N95 mask , face and eye shield , thus reducing chances of transmission of infection.
- The health care staff number was reduced to minimum and they are working in timed shifts.
- Disinfection of contacted surface is done regularly.

2. **OFFICE BASED AEROSOL GENERATING PROCEDURES**

- Office procedures like endoscopy which is routinely done in otolaryngology (nasal endoscopy, Hopkins endoscopy, fibreoptic laryngoscopy) are high aerosol generating procedures.
- Endoscopies are done on prior appointment basis and with adequate time interval between the two procedures , thus ensuring optimal instrument sterilization.
- Level 2 PPE is worn by the surgeon doing the procedure [16].

3. **OTOLOGY SURGERY**

Following steps are followed for patients being undertaken for Ear surgery

BEFORE ADMISSION

- All patients are screened at Flu clinic, before being seen at otolaryngology OPD.
- After the patient is examined by otolaryngologist in the OPD (wearing proper PPE) and admission is warranted, patients are admitted initially in the isolation ward till COVID-19 test report is available.

PREOP WORKUP

- Once the decision for surgery is made, consent is obtained from the patient or a close relative.
- The operating team consisted of minimum number of health care providers, including one each of Otolaryngologist, operating room assistant, nursing staff ,anaesthesiologist and a support staff.
- Entire health staff team wears full PPE kit including fluid repellant disposable cover all gown, N95 mask along with one triple layer mask, eye protection , shoe cover and double gloves.
- All team members were assigned their role distinctly before surgery to avoid any inadvertent delay and ensuring smooth functioning during the surgery. All necessary items which could be required during surgery were meticulously anticipated before and kept available inside operation theatre to minimise moving out of any staff during surgery.

SURGICAL PROCEDURE

- The mastoid drilling procedure was done under GA.
- Anaesthesia team practises all precautions to ensure smooth intubation and extubation by use of a glass shield cover to minimize aerosol spread.
- Use of two microscope drape, one to cover microscope and modified the second drape by making holes for working channel , covering patient and surgical field in a tent shape, thus minimising the dispersal of bone dust and aerosol particles.
- Use of cautery was discouraged to avoid aerosol generation.
- The surgery is done by experienced surgeon to limit duration of surgery.
- Local infiltration is done with saline and adrenaline to minimize bleeding and thus avoid use of cautery (cautery being an aerosol generating step).
- Standard mastoidectomy steps were Temporalis fascia is obtained only if deemed mandatory for the surgery (facilitated reduction of surgery duration).
- Mastoid drilling was done at low speed to minimise aerosol generation.
- Strict asepsis was ensured during each step.

OUR EXPERINCE

- We achieved good surgical outcome in all of our six cases. Strict adherence at each step to the recommendation was followed.

- None of our inpatient or health care team member contracted COVID-19 viral infection.

Conclusion

The combined effect of inherent nature of otolaryngologist work and respiratory droplets being the major source of transmission puts the otolaryngologist at an even greater risk of contracting infection than other health care workers. Although, it has become challenging to practice otolaryngology during the current pandemic, a strict adherence to the recommendations can significantly curtail the risk of transmission. At our centre we followed a strict protocol based on the available guidelines and could achieve non-transmission of virus to both the patients and health care providers.

Declarations

Funding : No funding was received for the study.

Conflict of interest : Authors have no conflict of interest to declare.

Availability of data and material: Data and material used were available to the authors.

Code availability (software application or custom code): Not applicable

Author Contributions : All authors have contributed in scientific content of the study.

References

1. Wu Z, McGoogan JM. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention. JAMA. 2020 Feb 24. doi: 10.1001/jama.2020.2648.

2. https://www.worldometers.info/coronavirus/country/india. Accessed 14 August 2020.

3. Zou L, Ruan F, Huang M, Liang L, Huang H, Hong Z, et al (2020) SARS-CoV-2 Viral Load in Upper Respiratory Specimens of Infected Patients. N Engl J Med 382(12):1177-1179.

4. https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-themedia-briefing-on-covid-19—11-march-2020. Accessed 14 August 2020.

5. Pitkäranta A, Jero J, Arruda E, Virolainen A, Hayden FG (1998) Polymerase chain reaction-based detection of rhinovirus, respiratory syncytial virus, and coronavirus in otitis media with effusion. J Pediatr 133(3):390-394.

6. Pitkäranta A, Virolainen A, Jero J, Arruda E, Hayden FG (1998) Detection of Rhinovirus, Respiratory Syncytial Virus, and Coronavirus Infections in Acute Otitis Media by Reverse Transcriptase Polymerase Chain Reaction. *Pediatrics* 102(2):291-295. doi:10.1542/peds.102.2.291.

7. Xu K, Lai X, Zheng L (2020) Suggestions on the prevention of COVID-19 for health care workers in department of otorhinolaryngology head and neck surgery. World J Otolaryngol Head Neck Surg. doi:10.1016/j.wjorl.2020.03.002.

8. Patel Z, Fernandez-MIranda J, Hwang P, Nayak J, Dodd R, Sajjadi H et al (2020) Precautions for endoscopic transnasal skull base surgery during the COVID-19 pandemic. https://med.uth.edu/orl/wp-content/uploads/sites/68/2020/03/Update-on- Precautions-Regarding-Endoscopic-Procedures-and-COVID-19-2020-03-22.

9. Vukkadala N, Qian ZJ, Holsinger FC, Patel ZM, Rosenthal E (2020) COVID-19 and the otolaryngologist – preliminary evidence-based review. The Laryngoscope. doi:10.1002/lary.28672.

10. Chen JX, Workman AD, Chari DA et al (2020) Demonstration and mitigation of aerosol and particle dispersion during mastoidectomy relevant to the COVID-19 era [published online ahead of print]. *Otol Neurotol*. doi:10.1097/MAO.0000000000002765.

11. Parker N, Schiff B, Fritz M, Rapoport S, Schild S, Altman K et al (2020) Tracheotomy Recommendations During the COVID-19 Pandemic. https://www.entnet.org/content/tracheotomy-recommendations-during-covid-19-pandemic. Accessed August 14, 2020.

12. Edwards SP, Kasten S, Nelson C, Elner V, McKean E (2020) Maxillofacial Trauma Management During COVID-19: Multidisciplinary Recommendations. Facial Plastic Surgery & Aesthetic Medicine. doi:10.1089/fpsam.2020.0158.

13. Workman AD, Welling DB, Carter BS, Curry WT, Holbrook EH, Gray ST et al (2020) Endonasal instrumentation and aerosolization risk in the era of COVID-19: simulation, literature review, and proposed mitigation strategies. Int Forum Allergy Rhinol. doi:10.1002/alr.22577.

14. Scott A, De R, Sadek SA, Garrido MC, Courteney-Harris RG (2001) Temporal bone dissection: a possible route for prion transmission?. *J Laryngol Otol* 115(5):374-375. doi:10.1258/0022215011907901.

15. Hilal A, Walshe P, Gendy S, Knowles S, Burns H (2005) Mastoidectomy and Trans-Corneal Viral Transmission. *The Laryngoscope* 115(10):1873-1876. doi:10.1097/01.mlg.0000177459.80574.2d.

16. Neha H, Nikhil R(2020) The Perils of Covid-19 for Otorhinolaryngologists: An Overview. Indian J Otolaryngol Head Neck Surg. https://doi.org/10.1007/s12070-020-01998-4.

17. Erdem AC (2020) COVID-19 Pandemic and Otologic Surgery. J of Craniofacial Surgery. doi: 10.1097/SCS.0000000000006694.

18. Prasun M, Prashant J, Maitri K, Purva A , Sagun K (2020) Our Experience of Tracheostomy in COVID-19 Patients. Indian J Otolaryngol Head Neck Surg. doi:10.1007/s12070-020-02036-z

19. Chong C, Qi Y , Di Z , Yu Z , Kun Z, Eric N et al (2020) Approaching Otolaryngology Patients During the COVID-19 Pandemic. Otolaryngol Head Neck Surg 163(1):121-131. doi: 10.1177/0194599820926144.
20. Guidelines for safe ENT Practice in COVID 19–MOHFW dt 03062020, https://www.mohfw.gov.in/pdf/ENTCOVID0306.pdf. Accessed 14 August 2020.
21. Hellier W, Mitchell T, Thomas S (2020) Mastoidectomy in the COVID Era –The 2 Microscope Drape Method to Reduce Aerosolization. British Society of Otology. https://www.yoifos.com/sites/default/files/mastoidectomy_in_the_covid_era_technical_guide.pdf Accessed 12 May 2020.

Figures

Figure 1

68 year-old-male with left hypogloassal nerve paralysis (A) consequent to skull base osteomyelitis. B. Cortical mastoidectomy initial steps demonstartes optimal protectective measures undertaken to minimise viral transmission.