

COVID -19 Pandemic Scenario and planning Mastoid surgeries

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Abstract

The SARS-CoV-2 virus (COVID-19) and subsequent pandemic have rapidly changed how physicians, specifically otolaryngologists, think about personal protective equipment (PPE) and patient and surgeon safety in the operating room. Most mastoid procedures are classified as elective and should be postponed during this time; however, a need will remain for some urgent/emergent procedures. There is insufficient data regarding the safety and timing of mastoid procedures, taking all these considerations into account, we have drafted certain guidelines regarding planning a mastoid surgery in those patients who are already diagnosed as a case of chronic supportive otitis media (CSOM) in the present scenario of COVID-19 pandemic. Clinical data was derived from peer-reviewed primary literature and published guidelines from national or international medical organizations. In the current state of pandemic, we do not recommend proceeding with elective procedures followed routinely, but our criteria of categorizing mastoid surgeries do provide help in creating appropriate protocol for protection of the patient as well as the surgeon, thus we are able to manage safely the patients who need urgent intervention in mastoid surgery. To facilitate the decision-making in the management of CSOM, careful selection of patients and timing of mastoid surgery can be divided into two groups (groups -1 and 2) with 3 and 2 sub-groups based on the extent of the disease and available resources. Therefore, categorization of mastoid surgeries into various sub-groups should help in the proper planning of surgery on a case-by-case basis, during the COVID-19 pandemic along with various safety measures.

Keywords: COVID-19, Personal protective equipment (PPE), Chronic suppurative otitis media (CSOM), Mastoid surgery.

INTRODUCTION

The corona virus disease 2019, or COVID-19, was first reported in Wuhan, Hubei province, China, in December 2019 and has since spread exponentially, resulting in a worldwide outbreak and a significant burden on the finite

resources, including personal protective equipment (PPE) in many health care systems.^[1] The current COVID-19 pandemic presents a significant occupational hazard for otolaryngologists. As information has rapidly evolved, it has become clear that the presence of elevated viral load in the upper airway

mucosa impacts on ear nose throat cases but also virtually all diagnostic and therapeutic procedures routinely performed by Otolaryngologists.^[2]

One aspect is that access to emergency care in Otorhinolaryngology (ORL) patients has already changed in the months following the onset of the COVID-19 outbreak, and, seemingly, many non-COVID illnesses have been virtually disappearing. Prevalence of CSOM in the world is around 65-330 million/year. Majority of world CSOM burden is attributed by Southeast Asia, Western pacific and African countries. India falls into countries with highest prevalence (prevalence > 4%).^[3]

Acute mastoiditis with convalescence, complicated mastoiditis, and complicated acute otitis media (AOM) often require prompt myringotomy and ventilation tube insertion and/or cortical mastoidectomy. In chronic cases complications are usually caused by progressive erosion of the bone thus increasing the risk of damage to facial nerve, labyrinth and the dura. The majority of otologic procedures are elective and can be postponed at this time; whereas, others are emergencies (complicated cholesteatoma with cerebral or Bezold's abscess, meningitis, sinus thrombosis, high-volume cerebrospinal fluid leak, facial palsy) and require immediate intervention.^[4]

Trans-mastoid and lateral skull base surgical procedures are particularly high risk for several reasons. First, the lining of the middle ear is continuous with the nasopharynx, the site of highest COVID-19 viral concentration.^[5] Prior studies detected a variety of respiratory viruses in the middle ear in the setting of upper respiratory infections.^[6,7] It is therefore reasonable to assume that COVID-19 virus is present in the

middle ear and mastoid. Second, otologic surgery often demands the use of high-powered drills and irrigation, which generates aerosols. Third, using the microscope wearing an appropriate PPE kit is challenging.

Now more than ever, it has become imperative that any decision-making regarding surgical management be driven by a risk-benefit assessment tailored to the individual patient. In some patients, surgery may be deferred and even follow-up visits should be postponed for a while. In others, the benefits of mastoid surgery outweigh potential risk of COVID infection. Taking all these considerations into account, we have drafted certain guidelines regarding mastoid surgery planning in those patients already diagnosed with CSOM during the COVID-19 pandemic.

This article proposes guidelines that need to be adapted for planning a mastoid surgery according to the region and pre-existing arrangements. ENT specialists, in collaboration with the operational hygiene teams and all other specialties involved, should follow these guidelines as appropriate for their organizations (dedicated treatment routes for COVID-19 positive patients, establishment of non-COVID areas of the hospital) and adapt them.

Data Sources: Clinical data was derived from peer-reviewed primary literature and published guidelines from national or international medical organizations. Pre-print manuscripts and popular media articles provided background information and illustrative examples.



MATERIALS & METHODS

Included manuscripts were identified via searches using PubMed, MEDLINE, and Google Scholar, while organizational guidelines and popular media articles were identified using Google search queries. Practice guidelines were developed via consensus among all authors based on peer reviewed manuscripts and national or international health care association guidelines. Strict objective criteria for inclusion were not used due to the rapidly changing scenario of COVID-19 pandemic and a paucity of rigorous empirical evidence. Non-peer-reviewed preprint manuscripts and popular media articles were reviewed to provide up-to-date background information in a rapidly changing environment but did not serve as a basis for practice recommendations.

DISCUSSION

Faced with the outbreak of SARS-CoV-2 (pandemic phase of COVID-19), a recommendation was made in March 2020 to cancel all non-urgent surgical or medical ENT activities where this did not involve a loss of chance for the patient.^[8]

In the ENT field, clinical examination and invasive procedures on the respiratory tract and on airway-connected cavities (nasal cavity, paranasal sinuses, middle ear) expose ENT surgeons to direct transmission of SARS-CoV-2 by inhalation of contaminated droplets or ocular projection, or to indirect transmission by contact with contaminated hands, surfaces or objects. Medical and surgical procedures are therefore considered to put practitioners and nursing staff at high risk when they come into

contact with patients either confirmed or suspected to have COVID-19.^[9]

To understand the risk of otologic procedures in the setting of an airborne viral pandemic, considerations must be made to both the viral load present and the inherent risk of aerosolization during otologic procedures, particularly with high-speed instrumentation. The emergent otology surgery need prompt treatment, thus proper COVID-19 protocols should be followed while doing otology surgery like wearing PPE (N95 mask, double gloves, respirator, eye protection, face shield, gown, shoe cover), limit attendance to essential personnel and use negative pressure room.

Double drape is beneficial with drilling and suctioning to be carried out under the plastic tent to reduce aerosol spread in the environment.^[10] Proper removing of the tent setup, including rolling of patient drape is needed to reduce aerosol spread. Mastoid surgeries should adhere to general guidelines set for high-risk procedures.

Based on the recommendation by Saadi et al. any otological procedure may be classified as elective (planned surgery within 6–12 months), semi-elective (surgery within 3–6 months), semi-urgent (surgery within 48 h) and urgent (within 6–12 h). Under normal circumstances, most surgeries for uncomplicated CSOM may be done as a semi-elective procedure, i.e., with 3–6 months, or as an elective procedure (within 6–12 months), depending on a case-by case basis.^[11]

Most otologic procedures are classified as elective and should be postponed during Covid time; however, a need will remain for

some urgent/emergent procedures. Figure No.1 show the classification adopted in

categorizing the mastoid surgeries.

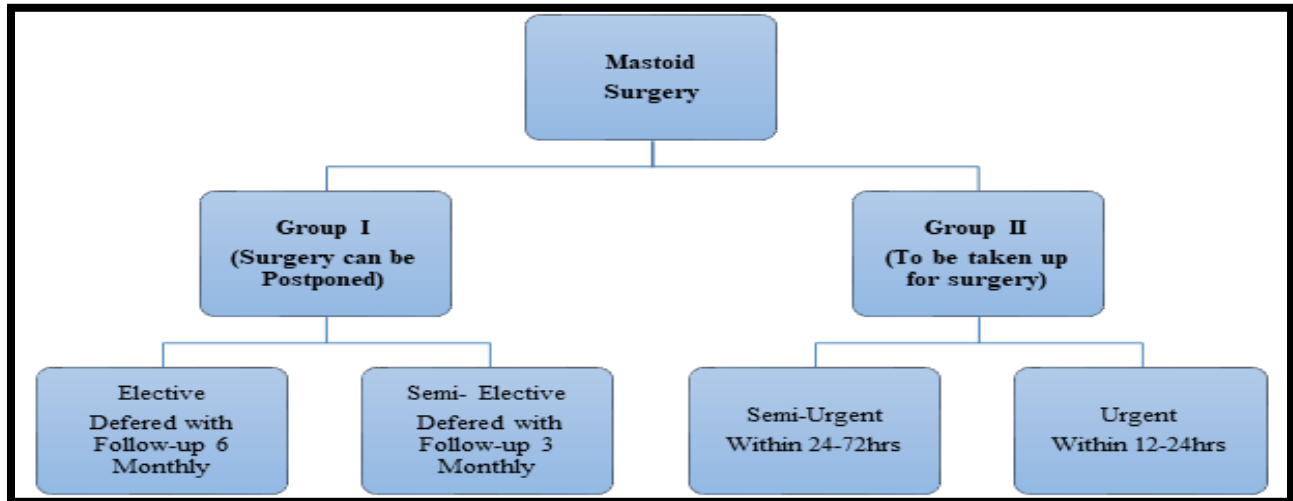


Figure No. 1: Categories of mastoid surgery during the COVID-19 Pandemic

Group I	Clinical findings/radiological Findings (High-resolution CT temporal bone)	Timing of surgery in COVID phase
1	Inactive disease (dry ear, conductive hearing loss, no significant bone erosion in the HRCT)	Elective
2	Inactive disease (dry ear, significant bone erosion in the HRCT)	Semi-elective
3	Active disease, no significant bone erosion (no vertigo, no facial palsy, no lateral canal fistula, no CSF leak)	Semi-elective
Group II	Clinical findings/radiological (High-resolution CT temporal bone)	Timing of surgery in COVID phase
1	Active disease, significant bone erosion (lateral canal fistula with vertigo and sensorineural loss [in only hearing ear], meningocele with CSF leak, facial paresis or facial palsy, mastoid abscess, petrositis)	Semi-urgent
2	Active disease with life-threatening complications (meningitis, lateral sinus thrombosis, intracranial abscess)	Urgent

Table No. 1: Clinical groups and recommendation of timing of mastoid surgery in patients during COVID-19 pandemic.

We divided the patients for mastoid surgery into groups I and II using the clinical and radiological data as criteria for dividing into various clinical sub-groups.(Table No: 1).

The decision for the timing will be prioritized by the current COVID status of the patient with increased availability of COVID-19 testing, the surgical planning may be done on a case-by-case basis. Here, the timing may be modified in COVID positives, as the primary disease is less dangerous than COVID-related complications. Re-scheduling of patients who are COVID negative with uncomplicated CSOM may help the capacity of the existing health care system to meet the existing needs. This is very much dependent on the phase of the pandemic.

Group I: Patients with CSOM where surgery that can be deferred (has 3 clinical groups).The characteristics of clinical group - I are:

1. Patients with inactive disease are those who have a dry ear with conductive hearing loss without significant bone erosion in high-resolution CT scan (HRCT) temporal bone and could be planned for elective surgery.
2. Those having bone erosion in HRCT, but no risk for impending complications, will need surgery as semi-elective. However, with the availability of COVID testing and the surgical planning may be changed on a case-by-case basis.
3. Patients with active disease but with no significant bone erosion (No vertigo, no facial palsy, no lateral canal fistula, no CSF leak) surgery can be planned as semi-elective. In an active discharging ear, dry mopping or micro-suctioning (using a suction tip with no control hole) in the clinic can be performed till surgery.

Group II: Patients with unsafe CSOM requiring surgery during the pandemic (has 2 clinical groups) irrespective of the current COVID status of the patient as the risk of the complications is far greater than the risk posed by the COVID-19 infection. Patients must be duly counseled that prognosis of the surgical intervention is poorer if the patient is positive for the COVID-19 infection. Surgeons must also consider factor making a risk-benefit assessment regarding treatment. The characteristics of clinical group II are:

1. When patient presents with complications like facial palsy, lateral semicircular canal fistula and sensorineural hearing loss (in an only hearing ear), meningocele with CSF leak, mastoid abscess or petrositis, surgery will need to be performed as a semi-urgent procedure.
2. Patients with potential life-threatening complication like lateral sinus thrombosis or intracranial abscess will need urgent surgery.

In the current situation, we do not recommend proceeding with elective procedures which are followed routinely, but our criteria of categorizing mastoid surgeries do help in establishing appropriate protocol for the protection of the patient as well as surgeon, and thus safely managing patients who need urgent intervention in mastoid surgery.

CONCLUSION

This proposed plan of mastoid surgeries helps in the optimal timing for surgical intervention in all patients with or without COVID-19 infection, thus avoiding unnecessary anxiety for the patient as well as for the surgeon. The indications for mastoid surgery under these



circumstances must be selective as much as possible without compromising the safety of the patient and operating surgeon.

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