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BRIEF COMMUNICATION

COVID-19: Operational Measures from a Surgeon's Perspective

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Abstract Novel corona virus, named as SARS-Cov-2 is the seventh coronavirus causing Corona Virus Disease (COVID-19) in human. It is one of the very few rare events in history of mankind to affect public health at such an enormous scale globally. Whole world is on standstill with this outbreak, which was declared pandemic by WHO in March 2020. All healthcare workers and especially the ones working in vicinity of nasal/oral regions are high risk group to be infected by this airborne virus. Recently, a 62 years old ENT specialist Liang Wudong died while treating patients with COVID in Wuhan city. Numerous reports of health care workers getting infected while serving their patients are coming from all parts of world. As health care providers are struggling to ensure safety and survival of people, their own wellbeing and preventing further spread of infection is also their responsibility. As head and neck surgical specialties are uniquely vulnerable to infection transmission, this communication highlights various instructions and suggestions given by International & National health agencies to safeguard the patient, surgical team, health workers and community. Though the decision regarding treatment is surgeon's discretion, we hope these guidelines will help in decision making.

Keywords COVID-19 · Surgeon's perspective · ENT · Oral & maxillofacial surgery

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Introduction

Novel corona virus, named as SARS-Cov-2 is the seventh coronavirus causing Corona Virus Disease (COVID-19) in human. The disease came into light in December 2019, starting from Wuhan in China, an epidemic which was declared pandemic by WHO in March 2020. Almost whole world has come to standstill with this outbreak. Every aspect of human life, may it be personal or professional is affected. It has pushed whole mankind to struggle for its survival and even non-human life forms are not spared. In absence of much information and treatment options for COVID, behavioral changes are the first line of defense. So social distancing, hygiene maintenance, lockdowns, work from home are some options to ensure personal safety. Healthcare workers are the frontline soldiers working in various capacities to ensure safety and survival. This makes them more vulnerable to such infections. Corona virus, with a primary spread through droplets of saliva and nasal discharge, long incubation period (reported up to 4 weeks), capability to survive on surfaces for (< 4 h–9 days) and symptoms imitating normal flu is posing hazardous working environment, especially to professionals working in vicinity of respiratory tract. Specialties working in head and neck regions like ENT and maxillofacial surgeries are uniquely high risk group for COVID-19 transmission.

It is our professional duty as healthcare worker to provide optimal care in our respective specialties, to the people in need. High priority vigilance on infection control and several alterations in surgical practices are required to counteract virus and achieve wellbeing of patients. A multifacet approach is required to address all pressing issues simultaneously.

Continuation of Required Consultation Facilities

Surgical requirements of patients in need of immediate attention have to be addressed, especially emergencies, but non-emergency or non-urgent can be postponed. It is more critical than ever to follow triage rigorously. Triage with the help of telemedicine and telescreening should be introduced as primary modality for OPD management, wherever possible. Practical guidelines for telemedicine are being provided by ministry of health and family welfare (MoHFW), India and by World Health Organization (WHO). Both patients and doctors should be encouraged to utilize this facility. Regular follow up and new cases can be attended with this facility by doctors. Only patients with genuine need of personal visit should be called for OPD. Minimizing the physical presence of patients in hospitals will markedly reduce the chances of infection spread.

Protection of Patients and Healthcare Workforce

It is found in various studies that the different strains of corona virus have capability to sustain its viability on various surfaces from < 5 [1] min to > 28 [2] days depending on environmental conditions, viral titer and nature of surface. To contain infection from such a virulent organism, complete chain of workforce right from doctor to waste handlers should be made aware and alert. Though medical professionals are always particular about infection control but now it should be re-emphasized and monitored rigorously. The knowledge of surgical level infection control protocol should be extended to non-clinical staff, sweepers, and waste carriers along with doctors, residents and nurses. Apart from sterilization surface disinfection, hand washing, barrier techniques and use of personal protective equipment (PPE), wherever necessary, should be thoroughly practiced. Many biocidal agents e.g. ethanol, sodium hypochlorite, glutaraldehyde, povidone iodine, formaldehyde etc. at different concentrations and exposure time are shown to reduce corona virus activity on surfaces [3–7]. G. Kampf et al. in their review concluded that Human coronaviruses can remain infectious on inanimate surfaces for up to 9 days. Surface disinfection with 0.1% sodium hypochlorite or 62–71% ethanol significantly reduces coronavirus infectivity on surfaces within 1 min exposure time [8]. Betadine mouthwash rinse can be advised to patients before examination as SARS (Severe Acute Respiratory Syndrome) and MERS (Middle East respiratory syndrome) are found to be highly susceptible to betadine [9].

Another important aspect which has substantial importance in prevention is strict monitoring of biomedical waste disposal. Central pollution control board (CPCB) in India has released instructions and protocols for handling the waste generated from healthcare establishments. All healthcare workers are supposed to follow biomedical waste management guidelines, 2016. Apart from that additional instructions are incorporated, especially for the hospitals where infected or quarantined patients are admitted e.g. use of two bags or double layered bags to prevent any accidental leak, separate dedicated bins and transportation trolleys for covid-19 waste, allocated storage room for corona-19 waste before it gets transferred to authorized medical waste treatment facility, regular disinfection of bins and trolleys etc. these instructions are also applicable to collection centers and laboratories.

Continuation of Required Surgical Facilities

All International and National healthcare agencies have advised to withhold all elective procedures. Royal college of surgeons (RCS) has classified surgical patients into five categories based on treatment priorities, to ease the triage for clinicians:

- Priority level 1a Emergency—operation needed within 24 h
- Priority level 1b Urgent—operation needed with 72 h
- Priority level 2 Surgery that can be deferred for up to 4 weeks
- Priority level 3 Surgery that can be delayed for up to 3 months
- Priority level 4 Surgery that can be delayed for more than 3 months [10].

Refer Tables 1 and 2 for ENT and Oral & Maxillofacial surgery (adapted from RCS) [10].

Most of the centers still do not have testing for Covid-19 available. In case of availability too, the results are delivered in 1–3 days. All patients seen in OPD's should be assumed to be infected and treated under recommended precautions, unless they have had 2 negative COVID-19 tests separated by at least 24 h. A cautious clinical discretion is also advisable while treating patients tested negative, as there are number of reasons for tests to appear negative; incubation period of virus is one of them. All advised precautions and use of PPE (Personal Protective Equipment) (Table 3) is advisable for ENT and Maxillofacial surgeons even during OPD, especially the surgeons working in high risk and infected zones. Based on experience in Wuhan, China, and Northern Italy, N95 masks were not enough to control this spread of the disease in some instances and it was not until PAPRs (Powered Air-Purifying Respirators) were introduced that transmission of the virus was controlled among medical personnel [11]. So

Table 1 Otorhinolaryngology (ENT)

Emergency (24 h)	Urgent (upto 72 h)	Upto 1 month	Upto 3 months	Over 3 months
Airway obstruction—Cancer/ Foreign body/ Sepsis	Uncontrolled epistaxis	EUA/biopsy for malignancy—hypopharynx/larynx	CSF fistula repair	All other Rhinology
Neck trauma with vascular/ visce ral/ airway injury	Sinus surgery for impending catastrophe	MDT directed nasopharyngeal surgery for malignancy	Symptomatic mucocoele (e.g. diplopia/recurrent infection)	Cholesteatoma—uncomplicated
Nasal/ear button battery removal	Acute mastoiditis and other middle ear conditions not responding to conservative Rx (e.g. Cholesteatoma complicated)	MDT directed oropharyngeal surgery for malignancy	Cochlear implant in pre-verbal profound hearing loss where delay will impact on long term outcome	Chronic suppurative otitis media
Life threatening middle ear conditions	Traumatic/ cholesteotoma related facial nerve palsy	Cochlear implantation post meningitis	MDT directed otological cancer surgery	All Ossicular Surgery/ Middle ear implants
Orbital cellulitis	Traumatic injury to the pinna	Baro-trauma perilymph fistula		Tympanoplasty Grommets Meatoplasty
	Lymph node biopsy—lymphoma where core biopsy inadequate	Organic foreign bodies in the ear		Vestibular Surgery
	Head and neck sepsis—not responding to conservative Rx	MDT directed treatment of small, high grade salivary cancers and sinus cancers		Non-organic foreign body (except button batteries)
				Cochlear Implants—other
				Uncomplicated nasal fracture

a watchful attitude with extreme level precautions is advisable.

When patients are undertaken for surgery certain aspects should be kept in mind to minimize the risk of infection transmission:

The surgical team, anesthetist team and support staff should be reduced to minimal. This will lower the number of people at risk as well as the errors of contamination.

Precautions in Airway Management

Preferably the airway should be managed by most experienced anesthetist as multiple attempts might increase the probability of complications. Paralysis is preferable to reduce cough reflex. Minimal usage of mask/bag ventilation and suction should be done to lessen the aerosol formation. American academy of Otolaryngology has issued recommendations regarding tracheostomy [12]. Few important points to retain are:

- Avoid tracheotomy in COVID-19 positive or suspected patients during periods of respiratory instability or heightened ventilator dependence.
- Tracheotomy can be considered in patients with stable pulmonary status but should not take place sooner than 2–3 weeks from intubation and, preferably, with negative COVID-19 testing.
- The patient should be paralyzed, preoxygenated, ventilation held before the trachea is incised to minimize aerosolization.
- Electrocautery and suction use should be minimized.
- Choose cuffed, non-fenestrated tracheotomy tube.
- Delay routine post-operative tracheotomy tube changes until COVID-19 testing is negative.

Table 2 Oral and maxillofacial surgery

Emergency (24 h)	Urgent (upto 72 h)	Upto 1 month	Upto 3 months	Over 3 months
Hemorrhage from maxillary/mandib ular trauma not responsive to conservative Rx (reduction and IR)	Facial fractures—not suitable for conservative Rx	MDT directed oropharyngeal/tonsil/ tongue cancer resection ± reconstruction	MDT directed resection of head and neck skin cancer—moderately/well differentiates with no metastases	All orthognathic Surgery
Dental Sepsis—not responding to conservative Rx and threatening life/ airway/sight/ brain		Facial fractures causing diplopia/ occlusal problems	MDT directed salivary gland tumours (low grade)	Dental extractions—adult and paediatric
Orbital Compartment Syndrome/Muscle Entrapment—threatening sight		Mandibular/maxillary orthognathic surgery—airway compromise unresponsive to conservative Rx AND unsuitable for tracheostomy—adults and children		MDT directed salivary gland tumours—benign
Jaw Dislocation—not responding to conservative Rx		Dental extractions—Adult and paediatric if unresponsive to conservative Rx (severe pain/ infection)		Post-traumatic/cancer facial deformity
		Craniofacial—ocular complication/ Raised Intracranial Pressure		Benign dental lesions—mandible/maxilla
				Temporo-mandibular joint surgery

MDT multi-disciplinary team

Table 3 Components of PPE kit

Preferably FPP3 or PAPR mask. In case of non-availability N95 / FFP2 mask with face shield
Gloves
Nonporous gown
Disposable head caps
Shoe covers

FPP filtering facepiece; *PAPR* Powered air-purifying respirators

Precautions by Surgical Team

- Suspected or confirmed COVID-19 patients should only be treated in negative pressure theaters or isolated theatres.
- Surgical teams should enter Operation Theater only after wearing complete PPE and surgeons are advised to take entry after atleast 20 min of intubation as based on the air exchange per hour, 99% of pathogens should be clear in 14 min, and 99.9% by 21 min [11].
- It has been recommended to coat the oral cavity and nasal passages of both the patient and the operating team with povidone iodine, before the procedure, as it has significant virucidal activity lasting approximately three hours [13].
- Aerosol and smoke generating procedures like use of Headpieces; Electrocautery etc. should be avoided, if possible.
- Whenever advisable, a closed procedure should be chosen over open surgical procedure.
- Open surgical procedures should be handled by expert surgeon to reduce surgical time and exposure to possible infection.
- Even the suctioning should be kept to minimal, to prevent aerosol formation.
- Use of scalpels instead of cautery, mopping pads instead of suctions, bipolar cautery over monopolar cautery, resorbable sutures can significantly reduce the infection risk.

Conclusion

Surgical procedures involving the nasal-oral-endotracheal mucosal region are high risk procedures as aerosolization of the virus which is known to be in high concentration in these areas when compared to swabs from the lower respiratory tract [14]. Though most of the recommended protocols are incorporated in surgeon's behavior, few modifications and increased surveillance can help in providing optimal treatment without infection risk to healthcare workers and society as well. As the researches are still in progress, surgeons should try to keep an eye on upcoming changes in patient management protocols. These are unusual circumstances and they demand exceptional efforts to keep everybody safe.

Compliance with ethical standards

Conflict of interest Authors declare that we have no potential conflicts of interests.

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