



COVID-19 AND OPHTHALMIC HEALTH: MAINFESTATIONS, IMPACT ON ROUTINE PRACTICE AND PREVENTIVE MEASURES

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ABSTRACT

The pandemic of COVID 19 is having a profound effect on lives of millions of people around world. Worldwide medical community is facing biggest challenge in modern history. The World is collectively in situation in which there's no experience as well as limited preparation. With cancellation or delay of all elective surgical procedures and limiting of out-patients visits, backlog will be enormous when restrictions are lifted. The ophthalmological clinic are more crowded areas in hospital with patients of all age group. Ophthalmologist pose direct risk due to proximity of eye health professional to patients and eye examinations. COVID-19 has implications for ophthalmologist and ophthalmic practice. A protocol for ophthalmic practice in the era of COVID-19 pandemic was established. The protocol covered patient screening, clinic flow, required personal protective equipment and modifications of ophthalmic equipment for improved safety, preventive measures and impact on ophthalmic practice.

KEYWORDS: Covid-19, Ophthalmology, Guidelines, lockdown, pandemic, precautions, preferred practice.

INTRODUCTION

In December 2019, an outbreak of a novel corona virus disease (COVID-19) emerged in Wuhan, China, and has quickly spread throughout the world.^[1] COVID-19 is a highly contagious disease capable of progression to acute respiratory distress syndrome and even death. Corona virus had been previously reported to be associated with conjunctivitis in humans. SARS-CoV-2 is capable of causing ocular complications such as viral conjunctivitis in the middle phase of illness. The clinical features of acute conjunctivitis occurring 13 days after onset in a patient with SARS-CoV-2 infection. SARS-CoV-2 in conjunctival specimens might represent a source of spread, particularly with higher viral loads at the acute stage of ocular complications.^[2]

Virology

In case of SARS-CoV, the initial interaction between the S1 domain of the virus interacts with either ACE2 or CD147, which is followed by S2 domain of spike protein mediated entry of the virus inside the cell, which is followed by replication of the same intracellularly and subsequent budding and release of virion progenies.^[3] Presence of Angiotensinogen and angiotensin converting enzyme (ACE) gene expression can be demonstrated by RT-PCR in retinal pigment epithelium (RPE), choroid and neural retina and sclera individually. Immunohistochemistry (IHC) studies shows, ACE and Ang-II were localized to non-pigmented epithelium of

ciliary body, corneal epithelium and endothelium, conjunctival epithelium and trabecular meshwork lining.^[4] In in-vitro studies also expression of ACE2 is positive in cornea and conjunctiva; the conjunctival and corneal cells can bind to the spike proteins (S240) of SARS-CoV.^[5]

Mode of transmission

Coronaviruses are mainly transmitted by large respiratory droplets via coughing and sneezing and direct or indirect contact with infected secretions. It is potentially transmissible through contact with or aerosol droplets from tears of infected patients. There is uncertainty over whether ophthalmologists, with close contact on slit lamps or other close up procedures, are at any increased risk compared with other health care professionals or whether there is any risk from aerosol generated in intraocular procedures such as phacoemulsification, although the latter seems unlikely given experience with patients carrying hepatitis or HIV. For SARS-CoV, evidence suggests that use of both respirators and surgical face masks offer a similar level of protection, potentially reducing the risk of infection by up to 80%.

Ocular manifestation of COVID 19

Conjunctiva and Cornea are most exposed part of eye to external environment, thus rendering them as susceptible target for virus infection. Conjunctivitis is first symptom

after that fever started (fig 2).^[6] Other ocular symptoms of infected patients as different ocular discomfort, conjunctival congestion, increase conjunctival secretion, ocular pain, foreign body sensation and increased tearing.^[2] The discharge is first watery which may become thin mucoid discharge along with occasional small piece of conjunctival haemorrhage.^[7] Among all covid-19 patients, the proportion of conjunctival/tear sample that was positive for the virus (RT-PCR detection of SARS-CoV-2) associated with conjunctivitis.^[8] Although RT-PCR testing of viral culture is very specific but it lacks sensitivity.^[9] To improve sensitivity multiple specimens can be tested.

The Ophthalmologists are very high risk to susceptible for virus infection. Therefore, certain guidelines have been laid down by various authorities over globe for urgent eye care and triage. It is important to understand what ocular emergencies condition are, that must be treated.

List of Ocular Emergencies (Table 1 and 2)

Table 1: Ocular emergencies Sign and Symptoms.

Sudden loss of vision	Injury to eye (chemical, thermal, mechanical)
Sudden onset of pain in eyes	Acute Red eye
Photophobia	Sudden onset lid lesion
Sudden onset diplopia	Sudden drooling of lid
Sudden onset of halos	Sudden onset of discharge from eye
Sudden onset of flashes/floater	Severe Headache with vomiting

Table 2: Ocular emergencies Condition.

Chemical injury	Blunt and Perforating trauma
H/O sudden vision loss(CRAO/CRVO/VH/RD)	Open globe Injury with or without Foreign Body
Lid trauma	Endophthalmitis
Acute Congestive glaucoma	Neovascular Glaucoma
Expulsive Choroidal Hemorrhage	Exposed infected buckle
Corneal abrasion/foreign Body/Corneal ulcer	Orbital cases with vision loss/tumour
Postoperative	IOP >38 mmHg
Conjunctivitis (rule out fever as these may need to screening for COVID 19, hence need to be referred)	Patients Requiring Intravitreal injection with Fresh bleed or those requiring for endophthalmitis

Basic Guidelines for Eye care

The WHO, Centers for Disease Control and Prevention (CDC), and Occupational Safety and Health Administration (OSHA) have given interim recommendations on standards and PPE to prevent infection among health-care providers and patients.^[10,11] Basic outline for Eye care during pandemic for Covid-19 as proposed by AIOS.^[12]

- Prior Scheduled Appointments of the routine OPD and elective surgeries should be postponed and rescheduled.
- All ophthalmologists should only provide emergency service for OPD and OT. But urgency must be determined by the one's judgement and the medical, social, economic and ethical circumstances of patients.

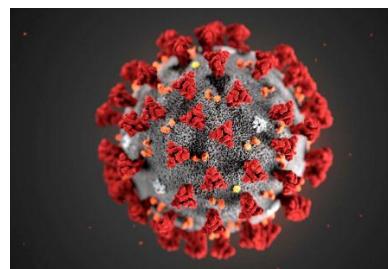


Fig 1.



Fig 2: Image showing Conjunctivitis.

Preventive Measures (General)

For staff

- All staff members to mandatorily wear face mask or N95 mask in hospital premises.
- All patients should be asked for screening questionnaires like TOCC (Travel to affected areas during the incubation period, Occupation, contact of a suspected or confirmed case, Cluster of cases.)
- Every staff/patient shall do Hand wash if possible or use hand sanitizer at the hospital at entry point.
- No attendant policy should be followed (Attendant only in case of pediatric patients, visually impairment, physically or mentally challenged patients).
- Patient screening desk should be functional with minimum and experience staff with best available methods of Personal Protective Equipment.
- All persons (patients, attendant, visitor & Staff) coming to hospital shall pass the Thermal screening.

7. Contact time with the patients should also be kept minimal. If longer durations or investigations mandating longer time required, the urgency of the indication must be kept in mind and be done as a part of strict medical need.

8. Disposable hand gloves should be used and immediately discarded into the trash. A face mask should be donned. Disposable operation theatre (OT) gown to be used in OT.

9. Social Distancing should be practiced by staff as well as by patients.

10. Patients education about current situation, preventive measures should be taken to safeguard themselves, early identification of symptoms and essential action should be taken.

11. Reduce instances of hand to hand transfer like handing over of bill/old prescription and can shift to electronic prescription/billing.

12. Avoid cash transaction and prefer digital billing.

13. Waiting room should be less crowded with minimum waiting time for patients.

14. Open door practice for good ventilation and display of information and education content.

For Patient

1. Patient must wear face mask and maintain 1 meter / 3 feet distance between 2 with Healthcare workers (this also includes distance from registration desk surface / other surfaces)
2. Use good tissue practice - CATCH IT, BIN IT and KILL IT – cough/sneeze into a tissue, throw it away as soon as possible, wash your hands after coughing and sneezing as soon as possible.
3. Self-medication should be discouraged.
4. They should be educated not to believe in bogus news and management protocol and rely on health care professionals only for treatment and guidelines for cure.

Procedures and Surgery

1. Any surgery if so, should be required day care.
2. PPE for all OT staff.
3. Surgeon with expertise should preferably do the surgery-safe and quick surgery.
4. Minimize procedures requiring touching of the eye by hand and/or lenses/equipment, where not of immediate critical importance for patient management.
5. Try to avoid GA unless mandatory.
6. Routine screening Chest X-ray before each surgery, if possible.
7. Stop positive ventilation in theatre during procedure and for at least 20 minutes after the patient has left theatre.
8. Disinfection of the OT should be done after each surgical procedure.
9. All staff coming in direct patient contact and ophthalmologists should be encouraged to take a soap bath at once they reach home.

Guideline for examination room^[13]

1. Breath guards for slit lamps-Ophthalmology is not currently on the national list for high risk aerosol generating procedures or care. But staff are concerned that there may be an increased risk because of the prolonged close contact on the slit lamp. All slit lamp to have protective shields acrylic/plastic/X-rays attach to prevent direct contact with patients. Materials should be cleaned with alcohol every 2 hourly. (fig 3)



Fig 3: Image showing protective shield for slit lamp.

2. Best corrected visual acuity should be checked by starting with best expected achievable line.
3. Applanation tonometer done with proper sterilization technique. Tonometer tip should be cleaned with alcohol and dry in air. Use single use disposable tonometer tip, if possible. Avoid NCT for measurement as there is risk of aerosol generation.
4. OPD –Trial frames, lenses to be wiped with alcohol swabs after doing refraction for each case. All non-essential, non-critical examinations should be avoided and patient explained need for more elaborate testing in future as feasible
5. If gonioscopy is done, immediately after procedure instruments should be sterilized.
6. Outer part of Perimeter can be cleaned and disinfected by alcohol swabs.
7. Contact Lens used for indirect Ophthalmoscope and Laser should be cleaned with soap and water followed by drying with clean tissue paper.
8. Laser procedure like YAG Peripheral Iridotomy should be considered, only in emergency condition (to resolve acute angle closure attack).
9. Special investigation like Visual field, OCT, UBM, Keratometry, A-scan, B-scan, Fundus photography should only be advised when they are critical to clinical decision making.
10. Additional Recommendations for Doctors and Optometrists-
 - o Stop Direct Ophthalmoscopy
 - o Stop Contact lens trial
 - o Stop routine refraction

Usage of hydroxy-chloroquine as prophylaxis for SARS-CoV2 infection^[14]

- No drugs are currently approved for COVID-19 disease, though some have been tried. The All India Ophthalmological society recommends the use of hydroxy-chloroquine for prophylaxis of SARS - CoV-2 infection for high-risk population as advised by Indian council of Medical Research.
 - Prophylaxis: ICMR has advised oral Hydroxychloroquine 400mg BD on day 1, followed by 400 mg OD weekly for 7 weeks.
 - The Advisory provides for placing the following risk population under chemoprophylaxis with hydroxy chloroquine.
1. Asymptomatic Healthcare Workers involved in the care of suspected or confirmed cases of COVID -19.
 2. Asymptomatic household contacts of laboratory confirmed cases.
- Next generation patients may present with different ocular toxicities of these agents and this may change the ophthalmologic scenario in case of COVID-19 management and ophthalmologist should be aware of it.

Implementing Teleophthalmology During COVID-19 Practice^[15]

Teleophthalmology is branch of Telemedicine delivering eye care using digital medical equipment and telecommunication technologies as well as adjunctive activities. Patients can access eye specialists overcoming distance, ophthalmic disease are screened, diagnosed and monitored. Main advantages of teleophthalmology is early detection of sight-threatening changes which can be treated. The patients treated here serve as health ambassadors to further disseminate information about benefits of teleophthalmology to surrounding villages and also help remove superstitious beliefs. Report from diabetic retinopathy, retinopathy of prematurity, macular eye disease seems to indicate beneficial use. Allowing specialists to provide care over a large region through a remote portal improves health outcome. High satisfaction level and acceptance is reported in the majority of the studies because of increased accessibility and reduced traveling during COVID-19 pandemic.

Impact of COVID-19 pandemic on Ophthalmic practice

For all Ophthalmologist, it's important to take extra cautions since most of our patients are more than 60 years of age. There is huge burden on Doctors to fight the Pandemic and at the same time exercise enough cautions so that they do not spread it to patients, colleagues and most importantly their family. Many ophthalmologists are forefront as well as facing time of great stress, fear, uncertainty. The COVID-19 pandemic forced the Medical Training Institute to suspends active teaching, defers elective surgery and routine OPD. This discontinuity from active learning has impacted their growth as an Ophthalmologist. Though there is no substitute for active interaction with patients, examining

and operating on them, but most of institute have switched to e-learning platform are being conducted through ZOOM, webinar and surgeries available on YouTube. Couple of months of lockdown will not impact the surgical skills they have acquired and things will come back to them when they get opportunity.

CONCLUSION

COVID -19 poses major problem for global health care system. As Health care Provider Ophthalmologists are affected because most of the patients are geriatric, also associated with comorbidities like Diabetes, Hypertension and, sadly, they are most vulnerable patients susceptible to virus. The key to Professional success is to limit exposure and continue our vigilant action plan to stay abreast of health guidelines as they are released. At same time, not to stress too much about finance. Triage based on the severity of the ophthalmic disease and COVID-19 status, appropriate and judicious use of masks and other PPE, social distancing, sanitization along with other mandatory precautions mentioned in this paper should help Indian ophthalmologists in performing their professional responsibilities without being the foci of disease transmission. Think of long-term profit margin rather than short term goals by focusing of Preventive aspect rather than Curative.

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