

COVID and Eye- What is Known Till Now?

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First case was reported in India from Kerala on January 30, 2020 in a student who had a travel history to Wuhan, China. Subsequently, there has been a sharp spurt, with total number of cases reaching to 5,734 as on the date of writing the article.

WHO has suggested that similar to SARS, COVID-19 also spreads through human to human transmission through droplets, contact and fomites.¹ It is estimated that the number of cases directly produced by one person, in population susceptible to infection for COVID-19 is 2.2% with the epidemic doubling time of 6.4 days.^{2,3} It is suggested that transmission occurs during the asymptomatic incubation phase³. Person-to-person transmission can occur even in the presence of isolation.^{4,5} There is also a risk of environmental contamination⁶ hence, strict adherence to hand and environmental hygiene is required⁶. The virus has also been found on the surface of door handles, cell phones and other possessions in residence of confirmed cases.¹ It has also been found in the stools of infected persons.⁷ It has been suggested that touching eyes, nose or mouth after contacting the contaminated items can also cause infection.⁸ It has not been confirmed yet if vertical transmission of virus can occur and it has not been found in the breast milk of infected mothers either.⁸

Reports suggest conjunctivitis can present as the first symptom of COVID-19.^{9,10} In a study published in New England Journal of Medicine, conjunctival congestion was documented in 9 of 1099 patients (0.8%) with laboratory confirmed COVID-19 from 30 hospitals across China^{11,12}. Tear samples from these patients were not evaluated.

Reports also suggest that in the absence of eye protection transmission can occur by aerosol contact with conjunctiva.^{9,10} On January 22nd, it was reported that Guangfa Wang, a member of the national expert panel on pneumonia, was infected during an inspection in Wuhan. He wore an N95 mask but no eye protection. He had developed conjunctivitis several days before the onset of pneumonia, implying that unprotected exposure of the eyes to the virus in the Wuhan fever clinic may have been the source of his systemic infection.⁹

A retrospective study of patients treated with COVID 19 from February 9 to 15, 2020 at a Centre in Hubei province, China was reviewed for ocular manifestations¹³. It was found that one-third of patients had ocular signs and symptoms, which frequently occurred in patients with more severe COVID 19 infection. Low prevalence of SARS Cov-19 was found in tears, but it was concluded that it was possible to transmit the disease via eyes. A total of 12 of 38 patients had ocular manifestations consistent with conjunctivitis, including conjunctival hyperemia, chemosis, epiphora and increased secretions. Among these 12 patients, 4 cases were judged as moderate, 2 were severe and 6 were critical patients which was graded according to guidelines of PC-NCP¹⁴. In these patients, 1 patient experienced epiphora as the first symptom of COVID-19. None had blurred vision. By univariate analysis, it was found that patients with ocular symptoms were more likely to have higher white blood cells and neutrophil counts and higher level of procalcitonin, C- reactive protein and Lactate dehydrogenase than patients without ocular symptoms. Also, 11 out of 12 patients with ocular abnormalities had positive results of SARS-Cov-2 on RT-PCR from both conjunctival and nasopharyngeal swabs. These results suggest that ocular symptoms commonly appear in patients with severe pneumonia. The American Academy of Ophthalmology (AAO) has updated interim guidance for triage of patients under the care of an ophthalmologist and its recommendations on appropriate personal protective equipment (PPE) for ophthalmic use.

In Journal of Medical Virology, a study of 30 patients hospitalized for COVID-19 in China revealed that 1 patient had conjunctivitis. The particular patient also tested positive for RNA in ocular secretions and not the other 29. This suggests that SARS- Cov- 2 might infect the conjunctiva and cause conjunctivitis, and that infectious viral particles might be present in tears of COVID-19 patients with conjunctivitis.¹²

In a study by Zhang et al of 72 confirmed COVID-19 patients at Tongji Medical College, 2 patients had conjunctivitis. One of the 2 with conjunctivitis had RNA in tears.¹²

In a paper by Zhou et al. of 63 confirmed COVID-19 patients in Wuhan, 1 had conjunctivitis, but the conjunctival swab was negative for viral RNA. Another patient with no clinical conjunctivitis had conjunctival swab positive for RNA and 2 were "probable".¹²

In a story from CNN, a nursing home in Washington Statereported that red eye was a common early sign in elderly COVID positive patients.¹²

A recent study published by Shaoqing Lei et al¹⁵. in China focusses on Clinical characteristics and outcomes of patients who underwent various elective surgeries in different hospitals across Wuhan while they were in incubation period of COVID-19. They examined a retrospective cohort of 34 patients who developed symptoms quickly after completion of surgery and eventually tested positive for COVID-19. One of the 34 patients underwent eye debridement. It was found that patients developed symptoms 2-6 days after surgery. Also, the median time for onset of severe complications and death was shorter than other patients who had not undergone any surgical procedure. 15 of these 34 patients needed ICU care and mortality was 20.5%. Most common complication in non-survivors was ARDS, shock, acute cardiac injury and arrhythmia. Thus, it was concluded that surgery may accelerate and exacerbate disease progression of COVID-19. Although no co-relation was done for type of surgery with outcome.

A study published in China assessed the magnitude of mental health outcomes and associated factors among health care workers treating patients of COVID-19 in China¹⁶. It was a cross sectional study of 1257 health care workers in 34 hospitals with fever clinics and wards for patients with COVID-19 across China. A considerable proportion of health care workers reported symptoms of depression, anxiety, insomnia and distress; especially women, nurses, those in Wuhan and front line workers directly engaged in diagnosing, treating or providing nursing care to patients with suspected or confirmed COVID-19. This suggests that psychological support interventions may be required for front line workers with higher associated risk factors.

This also suggests that these factors may also cause psychological impact on ophthalmologists. A patient might seek consultation for ophthalmic complaint while being in incubation period and this may cause depression, distress or anxiety amongst treating consultant. In long course, this can also cause economical impact.

AAOhas issued Interim guidance for triage of ophthalmology patients¹²

S. No.	Clinical Situation	Patient management/ Precautions
1.	Routine ophthalmic issues and previously scheduled appointments	<ul style="list-style-type: none"> Routine problems should be deferred and previously scheduled appointments to be cancelled

		<ul style="list-style-type: none"> Appointments should be rescheduled only upon clearance from public health authorities Refill all necessary medications
2.	Urgent ophthalmology appointment for a patient with no respiratory illness symptoms, no fever and no COVID-19 risk factors	<ul style="list-style-type: none"> Standard precautions Added precautions of not speaking during slit-lamp examination Use of surgical mask and eye protection in setting of adequate PPE supplies for clinician and patients may reduce pre-symptomatic transmission
3.	Urgent ophthalmic problem in a patient with respiratory illness symptoms, but no fever or other COVID risk factors	<ul style="list-style-type: none"> Can be seen in eye clinic Place in an examination room immediately with door closed with a surgical mask. Treating ophthalmologist and other personnel require surgical mask at minimum. Gown, gloves, surgical mask and eye protection are recommended for the clinician. An N-95 mask should be worn if a procedure is planned that will result in aerosolized virus. The examining room must be disinfected after examination
4.	Urgent ophthalmic problem in a patient who is at high risk for COVID-19	<ul style="list-style-type: none"> The patient is best sent to the ER or other hospital-based facility equipped to evaluate for and manage COVID-19. If the patient has an urgent eye problem based on screening questions, the facility should be one that is equipped to provide eye care in the hospital setting. If SARS-CoV-2 infection is confirmed, CDC (or hospital) guidelines for care of suspected COVID-19 patients should be followed for health care facility preparation and infection control.

		<ul style="list-style-type: none"> • Eye care is best provided in the hospital setting. Transmission precautions[‡] for treating ophthalmologists include wearing a surgical mask, gown, gloves and eye protection (face shield or goggles, if available).
5.	Urgent ophthalmic problem in a patient with documented COVID-19 (or person under investigation [PUI])	<ul style="list-style-type: none"> • The patient should remain in the hospital setting if possible. • Determine whether the eye problem is urgent based on screening questions, and if so, evaluation and management should be in the hospital setting. • If the patient is not hospitalized at the time of referral, the patient is best referred to the ER or other hospital-based facility equipped to manage both COVID-19 and eye care. • CDC or hospital guidelines should be followed for care of COVID-19 patients. • Transmission precautions[†] for treating ophthalmologists include wearing an N-95 mask, gown, gloves and eye protection (face shield or goggles, as above).

[‡]Standard (Universal) Precautions: Minimum infection prevention precautions that apply to all patient care, regardless of suspected or confirmed infection status of patient, in any health care setting (e.g., hand hygiene, cough etiquette, use of PPE, cleaning and disinfecting environmental surfaces).

^{**} Supply permitting, tight-fitting goggles may be preferable to face shields for eye protection.

Thus, Ophthalmologists may be the first health care providers to evaluate patients potentially infected with nCOVID 19. Hence, the proximity between ophthalmologists, health care provider and patients during examination, evaluation and treatment procedures may pose a direct risk of cross infection to other patients as well as to health care workers. The risk is

higher with unsuspected asymptomatic patients with subclinical infection.¹⁷ Routine aerosol generating procedures like non-contact tonometry should be avoided and tonometry tip should be cleaned after each case.¹⁸ It has been suggested to avoid general anesthesia, but if unavoidable, it is advised to use PPE during the procedure.¹⁹ To lower the risk of droplet transmission, a protective shield should be installed on slit-lamps.²⁰ Equipment like slit-lamps, ophthalmoscopes, computers and doorknobs that are frequently touched by the staff should be disinfected as per local disinfection guidelines.¹⁸ Personal meetings should be deferred wherever possible and replaced by virtual communications. The staff should be instructed to wash hands frequently as per hand hygiene guidelines recommended by WHO.²⁰

Hence, it is imperative that understanding of ocular manifestations of COVID by ophthalmologists may facilitate early diagnosis and prevention of transmission of the disease.

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Answer to Quiz No.3

1. Located in periphery of iris
2. Associated with Vitamin A deficiency
3. Feature of CRAO
4. Accumulation of axoplasmic material in nerve fibre layer
5. Ischemic infarcts of choroid
6. Senile scleral plaque
7. Myopic retinopathy
8. Epithelial opacities anterior to suture line of corneal graft
9. Anterior remnant of hyaloid artery at posterior surface of lens
10. Seen on FFA
11. Retinal hemorrhage with pale centre
12. Associated with POHS

A	C	N	I	L	E	F	K	P	S	X	C	S	G	Q	L	Z	G
Y	H	Z	N	D	C	G	Y	H	Y	F	Q	O	D	W	R	F	Z
V	E	P	B	I	T	O	T	Z	N	W	N	E	Y	Z	S	I	N
U	R	A	X	L	Q	B	N	K	S	E	V	B	Q	U	T	S	U
G	R	I	B	N	J	F	D	B	L	H	M	O	Z	X	K	C	P
X	Y	H	Q	P	G	R	O	K	M	L	I	Z	A	M	I	H	J
X	R	K	I	J	B	T	G	J	Q	N	P	S	L	V	Y	E	F
T	E	L	S	C	H	N	I	G	A	T	Z	B	T	C	L	R	W
F	D	Y	M	B	R	L	Q	U	E	Y	D	H	M	O	K	K	I
O	T	O	Q	L	E	K	V	X	Z	A	U	J	Z	T	X	H	D
C	L	M	I	T	T	E	N	D	O	R	F	B	V	T	S	U	K
R	C	W	H	D	X	O	R	S	K	Q	O	P	S	O	G	N	R
W	M	E	O	M	E	M	Y	H	I	M	S	T	Y	N	Y	T	H
P	D	L	J	R	L	Z	G	P	F	W	T	X	H	W	R	X	S
S	Q	A	D	B	H	R	M	F	L	K	E	M	T	O	V	M	K
L	M	N	E	O	R	L	E	O	P	A	R	D	C	O	W	T	P
H	F	U	R	I	S	U	T	W	N	Z	F	H	R	L	U	Q	G
R	M	K	A	Y	E	P	H	T	E	L	U	S	F	Y	X	Z	L
O	P	I	L	Z	X	O	M	L	Q	N	C	Z	O	T	F	N	X
U	N	P	T	D	Z	V	B	R	U	S	H	F	I	E	L	D	Y