

## Ocular Manifestations in Covid-19 Positive Patients Admitted to a Tertiary Care Centre in Uttarakhand, India: A Prospective Study

Rupali Tyagi<sup>1</sup>, Suchit Dadia<sup>2\*</sup>, Shreyansh Sharma<sup>3</sup>, Kshitij Nautiyal<sup>3</sup>, Deekshant Chauhan<sup>3</sup>

<sup>1</sup>Associate Professor, Affiliation to Department of Ophthalmology, Government Doon Medical College & Hospital, Dehradun, Uttarakhand, India

<sup>2</sup>Assistant Professor, M J Western Institute of Ophthalmology, B. J. Medical college, Ahmedabad, Gujarat, India

<sup>3</sup>Junior Resident, Affiliation to Department of Ophthalmology, Government Doon Medical College & Hospital, Dehradun, Uttarakhand, India

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### Abstract

**Purpose:** To report the ocular manifestations in COVID-19 patients admitted in a tertiary care centre turned into dedicated covid hospital in state of Uttarakhand, India. **Materials and Methods:** This was a single center prospective study of 1950 COVID-19 positive patients, confirmed for presence of SARS-CoV-2 Virus in nasopharyngeal swabs by real time PCR, who were admitted consecutively in Doon Hospital attached to Government Doon Medical College (GDMC) during a time period of 6 months from 30<sup>th</sup> March 2020 to 3<sup>rd</sup> October 2020. Ocular history and maximum permissible ophthalmic examination was done for all patients with any ophthalmic complaints. Demographic data was collected from hospital records. **Results:** Cohort size was of 1950 COVID-19 patients with a median age of 45 years with male preponderance (1365 males, 585 females). Of 1950 patients, only 7 (0.36%) had ophthalmic manifestations with conjunctival congestion being the most common (3/7- 42.8%), 2 cases of frank conjunctivitis (28.57%), one subconjunctival hemorrhage (14.2%) and superficial punctate keratitis (SPK) in one case (14.2%). Out of total 7, only one was female (14.2%). 4 out of 7 (57.2%) patients of acute respiratory illness developed ocular symptoms post admission while conjunctival congestion was the presenting complaint in the other 3 (42.8%). The average duration of ocular symptoms was 5.5 days. All cases recovered with medications within an average period of 13.3 days. **Conclusion:** We conclude in our study that ocular manifestations in COVID-19 patients with Acute respiratory illness are fortunately mild and self-limiting. Screening of patients with conjunctival congestion or frank conjunctivitis by ophthalmologists is advocated during the outbreak of COVID-19, as they could be the presenting ocular features. Though not always, frequent hand-eye contact may be a risk factor. It is essential to provide proper eye care equipment and strengthen education on eye protection among eye care professionals during such outbreaks. We need more studies and data collection to authenticate our findings.

**Keywords:** conjunctivitis, COVID-19, ocular

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### Introduction

In present scenario, the whole world is struggling with deadly COVID-19 virus and though cases have gone down yet the threat is far from over. In December 2019, an outbreak of a novel beta corona virus disease (SARS-CoV-2) emerged in Wuhan, China and quickly spread throughout the world. This virus is highly contagious resulting in a disease starting from flu like symptoms but capable of progression to acute respiratory distress syndrome (ARDS) and even death [1-3]. There have been several reports of eye redness, irritation and tearing in COVID-19 patients, both suggesting that conjunctivitis may be the presenting symptom of SARS-CoV-2 infection. A study conducted during the 2003 Severe Acute Respiratory Syndrome (SARS) outbreak detected SARS-CoV in tear samples in SARS patients in Singapore. Lack of eye protection was a primary risk factor of SARS-CoV transmission from SARS patients to healthcare workers in Toronto, prompting a concern that respiratory illness could be transmitted through ocular secretions. It has been observed

that ophthalmologists are at special risk of becoming infected, because of the proximity of the patient during ocular examination. Indeed, one of the first whistle blower was Li Wenliang, MD, an ophthalmologist who himself died from COVID-19 and was believed to have contracted the virus from an asymptomatic glaucoma patient in his clinic [4]. The purpose of our study was to evaluate the clinical profile of ocular manifestations in COVID-19 patients admitted in our hospital.

### Materials and Methods

The Institutional Ethics Committee for research on human subjects of the parent institution approved the study. The study was performed as per the tenets of the declaration of Helsinki. Informed consent was obtained from the patients involved. This was a single centre, prospective study conducted on 1950 COVID-19 positive symptomatic patients admitted consecutively between 30<sup>th</sup> March 2020 to 3<sup>rd</sup> October 2020 at Doon Hospital attached to GDMC, Dehradun, Uttarakhand India. Patients were confirmed for being COVID-19 positive by real time Polymerase Chain Reaction (rt-PCR) testing done on nasopharyngeal swab samples. Diagnosis was done based on guidelines provided by Ministry of Health and Family Welfare, Directorate General of Health Services, India. Demographic, epidemiological and systemic illness data was collected from the hospital record files. Detailed ocular history of the patient was collected from the patients themselves and also from

\*Correspondence

**Dr. Suchit Dadia**

Assistant Professor, M J Western Institute of Ophthalmology,  
B. J. Medical college, Ahmedabad, Gujarat, India

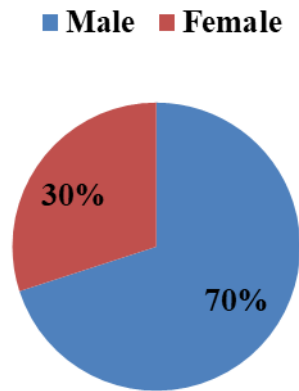
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their relatives through telephonic communication. Ocular examination was done by an ophthalmologist during the ward rounds wearing complete personal protective equipment (PPE) using a torch light attached to a head band between 0 to 5 days of admission for all patients. The findings were roughly noted on a piece of paper and jotted down in the patient's case file after proper doffing of the PPE kit and thorough disinfection of the ophthalmologist [5-7]. An approximate assessment of visual acuity was done by finger counting in the ward itself. Ophthalmoscopy and slit lamp examinations were strictly avoided for reasons of safety and to counter the disease spread [8-10].

**Statistical analysis:** Data was analyzed using SPSS software. A p value of <0.05 was considered statistically significant.

**Results**

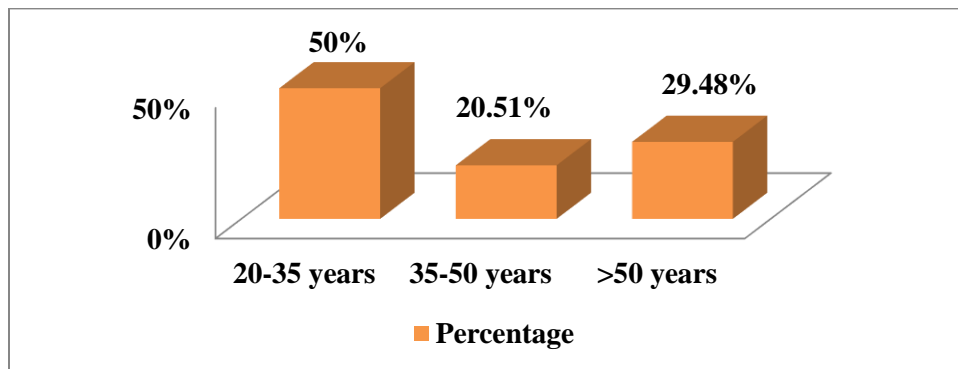
The demographic data and systemic history of the patients admitted on different dates were collected from hospital records. A total of 1950 patients were included in this study. The median age of the patients was 45 yrs (20-50 yrs) (Table -1, Fig-2) including 1365 (70%) males and 585 (30%) females. (Fig-1)



**Fig 1: Gender Distribution of Covid -19 patients**

**Table 1: Age distribution of Covid -19 patients**

S.No	Age group	Number (Percentage)
1	20-35 years	975 (50%)
2	35-50 years	400 (20.51%)
3	>50 years	575 (29.48%)



**Fig 2: Age distribution of Covid -19 patients**

Out of 1950 patients, 7 had ocular complaints. Out of 7, conjunctival congestion 3 (42.85%), Conjunctivitis 2 (28.57%), subconjunctival hemorrhage 1 (14.28%), superficial punctate keratitis 1 (14.28%). (Table-2) Out of 7, 1 was female (14.2%) and 6 were males (85.7%).

Average duration of Ocular symptoms was 5.5 days. Recovery period was within 13.3 days average. (Table-2, Fig-3)

**Table 2: Ocular manifestations in Covid-19 patients**

Ocular manifestations	No. of patients
Conjunctival congestion	3/7 (42.8%)
Frank conjunctivitis	2/7 (24.57%)
Subconjunctival hemorrhage	1/7 (14.2%)
Superficial punctate keratitis	1/7 (14.2%)
Others	Nil

## Ocular Manifestations

■ Conjunctival Congestion      ■ Conjunctivitis  
 ■ Sub Conjunctival Hemorrhage ■ SPK

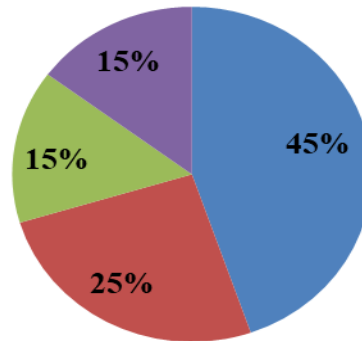


Fig 3:Ocular manifestations in COVID – 19 patients

Out of 7, 3 patients had conjunctival congestion as presenting symptom and 4 patients developed COVID symptoms later on. (Table-3)

Table 3:Correlation of ocular manifestations with Acute respiratory illness

Correlation of ocular manifestations with Acute respiratory illness		No. of patients
As presenting symptom		3/7 (42.8%)
Developed post respiratory illness		4/7 (57.1%)

Table 4: Comparison of Ocular manifestations of COVID-19 with other studies

Study	Type	Location	Sample (ocular manifestation/total sample studied)	Age (mean/median) (years)	Duration between COVID-19 symptoms/diagnosis and ophthalmic symptoms (days)	Diagnosis
Sindhuja <i>et al</i>	Retrospective Cross sectional	India	11/127	38.8 (median)	Mean 9.4 Initial in one	Conjunctival congestion, lid edema, hyperaemia, watering
Wu <i>et al</i>	Retrospective case series	China	12/38	67 (Mean)	NA	Conjunctival chemosis, epiphora, hyperaemia, secretions
Chen <i>et al.</i>	Cross sectional study	China	27/535	44 (Median)	NA	Conjunctival congestion
Present Study	Cross sectional study	India	7/1950	45 (Median)	NA	conjunctival congestion, Conjunctivitis, subconjunctival hemorrhage, superficial punctate keratitis

**Discussion**

Though Covid -19 virus has proven fatal in many patients, but as far as ocular manifestations are concerned, they are neither very common nor severe from whatever information we have received in limited published literature. The overall prevalence of ocular

manifestations in present study was (0.36%) which is far less as compared to other studies done so far. However male preponderance with relatively younger age group was comparable. Only 9 (0.8%) out of 1,099 patients from 552 hospitals across 30 provinces in China

were reported to have conjunctival congestion. As per a study conducted in Hubei Province of China, one-third of patients with COVID-19 had ocular abnormalities, which frequently occurred in patients with more severe COVID-19. Although there is a low prevalence of SARS-CoV-2 in tears, it is possible to transmit via the eyes[6] In our study conjunctival congestion was the most common manifestation (42.8%), followed by frank conjunctivitis in 24.57% of cases. "A recent case series reported ocular symptoms in 12 (31.6%) of 38 hospitalized patients with COVID-19 in Hubei province, China. These 12 of 38 patients had conjunctival hyperemia (3 patients), chemosis (7 patients), epiphora (7 patients), or increased secretions (7 patients). Of note is that one patient who had epiphora presented with epiphora as the first symptom of COVID-19. Only one patient in this study presented with conjunctivitis as the first symptom." "A study conducted at RP centre AIIMS, 11 (8.66%) out of 127 had COVID-19-related ocular manifestation and prevalence of conjunctival congestion among mild COVID-19 positive patients is 6.29% (8 out of 127 patients). Out of eight patients, two (25%) patients developed conjunctival congestion without any COVID-19-related systemic symptoms and one (12.5%) patient developed conjunctival congestion before the onset of COVID-19 symptoms. Five (62.5%) out of eight patients had only conjunctival congestion without any associated ocular complaints[7-10] In a meta analysis by Loffredo et al, they stated that the overall rate of conjunctivitis in confirmed patients with COVID-19 was 1.1%; it was 3% and 0.7% in severe and non-severe patients with COVID-19. They concluded that conjunctivitis is more frequent in severe COVID and may be a warning sign of poor outcomes[8]. Prevention strategy is the most important factor in limiting the spread of disease. Apart from social distancing and personal hygiene, patients should avoid the direct touching of the eyes and face, avoid wearing contact lenses and applying eye cosmetics. Ocular shedding of the COVID-19 virus via tears is a distinct possibility of which ophthalmologists should be aware. Conjunctivitis or hyperemia can be the presenting feature in patient with the COVID-19 infection. The ocular examination should be performed while wearing gloves. There should be clear communication between hospital administration and eye care providers regarding expectations for screening patients, wearing personal protective equipment (PPE-Kits)[11-15] In the presence of such life-threatening infections such as this, ophthalmologists have to achieve a balance as eye care is not an emergency with few exceptions. There is a need of stratification of ophthalmic patients for clinic visits, however some conditions like retinal detachments, orbital cellulitis and trauma require urgent attention[16]

#### Conclusion

Ocular manifestations in present study depicted male preponderance with relatively younger age group. Flu like symptoms were preceding ocular manifestations in majority of the cases with conjunctival congestion being the commonest. Though it was not in all the cases, but chances of spread by hand eye contact is definitely a risk factor. Fortunately in our study ocular manifestations in COVID positive patients were not very severe and self limiting but we need to be cautious of sight threatening complications due to vascular occlusions resulting in retinal ischemia especially CRAO, as thromboembolic phenomenon due to COVID 19 virus has been well documented.

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