

OCULAR MANIFESTATIONS IN LABORATORY CONFIRMED COVID-19

Dr Shakti Krishan Rajguru¹, Dr. Udesb Rajpurohit²

¹MBBS, MS, Ophthalmology, Junior Specialist, Department of Ophthalmology, Government Medical College, Barmer, Rajasthan

²Junior Resident, Government Medical College, Barmer, Rajasthan

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Corresponding author: Dr. Udesb Rajpurohit

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Abstract

Background: Scarce literature has been published thus far regarding ocular findings in the COVID-19.

Methods: All patients were confirmed by SARS-CoV-2 real-time reverse transcriptase– polymerase chain reaction (RT-PCR) of nasopharynx or oropharynx swab specimens collected at an isolation facility, fever clinic, or hospital unit designated for suspected cases pending confirmation.

Results: Overall, 25 patients (25.00%) had various ocular symptoms during COVID-19 infection. Among those with ocular symptoms, 19 patients (76.00%) presented with increased conjunctival discharge, including white mucoid (6 [24.00%]), thin watery (3 [12.00%]) and yellow-green purulent (11 [44.00%]) discharge, and with conjunctival congestion (2 [8.00%]). Other ocular manifestations contained ocular pain (3 [12.00%]), tearing (1 [4.00%]), and eyelid swelling (1 [4.00%]).

Conclusion: We concluded that common ocular manifestations were conjunctival discharge, eye rubbing, and conjunctival congestion.

Keywords: COVID-19, Ocular, Eye.

Introduction

Since December 2019, coronavirus disease 2019 (COVID-19) has become a global pandemic caused by the highly transmissible severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).¹ Initially, there were several reports of eye redness and irritation in COVID-19 patients, both anecdotal and published, suggesting that conjunctivitis is an ocular manifestation of SARS-CoV-2 infection. Reports continue to emerge on further associations of COVID-19 with uveitic, retinovascular, and neuro-ophthalmic disease.

During the 2003 severe acute respiratory syndrome (SARS) outbreak, a study detected SARS-CoV in tear samples in SARS patients in Singapore.² 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.^{3,4} Similar concerns have been raised with SARS-CoV-2, especially among eye care providers and those on the front lines triaging what could be initial symptoms of COVID-19.

As conjunctivitis is a common eye condition, ophthalmologists may be the first medical professionals to evaluate a patient with COVID-19. Indeed, one of the first providers to voice concerns regarding the spread of coronavirus in Chinese patients was Dr. Li Wenliang, MD, an ophthalmologist. He later died from COVID-19

and was believed to have contracted the virus from an asymptomatic glaucoma patient in his clinic.⁵⁻⁶

Material and Method

Laboratory-confirmed patients with COVID-19 were included in the study. All patients were confirmed by SARS-CoV-2 real-time reverse transcriptase– polymerase chain reaction (RT-PCR) of nasopharynx or oropharynx swab specimens collected at an isolation facility, fever clinic, or hospital unit designated for suspected cases pending confirmation.

The demographic information and clinical manifestations of patients were collected through medical record review, including name, sex, age, exposure history, past medical history, onset of symptoms, admission time, hospital stay, and laboratory testing and imaging results. All data were collected and independently reviewed by all research team members. Although some of the data on demographic and clinical characteristics were shared with the other studies, data on the ocular manifestations of the children with COVID-19 have not been reported anywhere else.

Diagnostic criteria of COVID-19 included epidemiology history, clinical manifestations, and etiologic evidence provided by RT-PCR testing. Definitive etiologic evidence was required. Asymptomatic patients with COVID-19 were defined as such that the SARS-CoV-2 RT-PCR test

was positive, but there had been no symptoms before the laboratory confirmation. The severity of the disease was classified according to 7th edition guideline for diagnosis and treatment of COVID-19.

Data analysis

Data was recorded as per Performa. The data analysis was computer based; SPSS-22 was used for analysis. For

categoric variables chi-square test was used. For continuous variables independent samples's *t*-test was used. *p*-value <0.05 was considered as significant.

Results

A total of 100 patients were included, of which 25 participants (25.00%) reported ocular symptoms.

Table 1: Patients characteristics

Age in yrs	56.22±3.16
Male : Female	64 : 36
BMI in kg/mt ²	23.11±3.16
Patients with ocular manifestations	22/100 (22.00%)

Table 2: Ocular Manifestations in patients With Confirmed COVID-19 (n=25)

Conjunctival discharge	19(76.00%)
White mucoid discharge	6(24.00%)
Thin watery discharge	3(12.00%)
Yellow green purulent discharge	11(44.00%)
Conjunctival congestion	2(8.00%)
Ocular pain	3(12.00%)
Tearing	1(4.00%)
Eyelid swelling	1(4.00%)

Overall, 25 patients (25.00%) had various ocular symptoms during COVID-19 infection. Among those with ocular symptoms, 19 patients (76.00%) presented with increased conjunctival discharge, including white mucoid (6 [24.00%]), thin watery (3 [12.00%]) and yellow-green purulent (11 [44.00%]) discharge, and with conjunctival congestion (2 [8.00%]). Other ocular manifestations contained ocular pain (3 [12.00%]), tearing (1 [4.00%]), and eyelid swelling (1 [4.00%]).

Discussion

To our knowledge, large case series of ocular manifestations of COVID-19 have not been reported.

Among 100 participants, 25 (25.00%) experienced ocular symptoms. Although several studies reported the ocular findings in COVID-19, the correlation between ocular symptoms and COVID-19 remain controversial, regardless of ocular detection of SARS-CoV-2.⁷⁻⁹ Could SARS-CoV-2 really cause viral conjunctivitis?⁸

Anatomically, the ocular surface (including cornea, conjunctiva, and tear film) communicates with air just like the nasalmucosa. Furthermore, the nasolacrimal duct links the conjunctival sac with the nasal meatus, which could provide the opportunity for the viruses to travel from the respiratory tract to the ocular surfaces. Histologically, angiotensin-converting enzyme 2, which is necessary when SARS CoV-2 infects host cells by the receptor-binding motif, was found to be present in ocular tissues. Whether the ocular disease was directly caused by

SARS-CoV-2 remains unknown, and more studies are needed.¹⁰⁻¹¹

However, children with systemic symptoms (eg, fever, cough) appeared more likely to have ocular symptoms. It is plausible that cough can lead to ocular infection through inevitable hand-eye contact in children and/or that the force of cough could push nasopharyngeal secretions from the nasolacrimal duct into the conjunctival sac.¹²⁻¹³

Conclusion

We concluded that common ocular manifestations were conjunctival discharge, eye rubbing, and conjunctival congestion.

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