



A STUDY TO ASSESS OCULAR FINDINGS IN POST COVID PATIENTS IN TERTIARY MEDICAL CENTRE IN SOUTH BIHAR

Ophthalmology

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ABSTRACT

Background: COVID-19 has been reported to be associated with ophthalmologic abnormalities, such as conjunctivitis, chemosis, retinopathy, or optic neuritis. Conjunctival infection may occur from droplets or from infected structures coming into contact with the eye

Materials and Methods: A cross sectional study was performed in the Department of Ophthalmology, Narayan medical college Jamuhar, South Bihar during June 2020 to June 2021 on the patients visiting ophthalmic OPD with ocular complaints during or after the recovery phase of Covid 19. RT-PCR positivity was used as confirmation for covid 19. Patients were only included if they had a positive nasopharyngeal PCR for SARS-CoV-2 and presently non critical, asymptomatic.

Results: The most common ocular abnormality was conjunctival injection, followed by vision changes and ocular irritation. Age, gender, presence of prior ocular history, fever during hospitalization, mechanical ventilation, and increasing inflammatory markers were not significantly associated with the presence or development of ocular symptoms.

Conclusion: Majority of study subjects developed ocular abnormalities within day 30 of onset of COVID symptoms. The most common ocular abnormality was conjunctival injection, followed by vision changes and ocular irritation.

KEYWORDS

conjunctival congestion, covid-19, RT-PCR, Scleritis

In December 2019, an outbreak of a novel coronavirus 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. The infectious agent of this disease entity is caused by a novel beta coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). (2)

COVID-19 has been reported to be associated with ophthalmologic abnormalities, such as conjunctivitis, chemosis, retinopathy, or optic neuritis. (3) MRI orbital abnormalities have been reported but no MRI studies have been published about globe abnormalities to the best of our knowledge to date. (4)

Conjunctival infection may occur from droplets or from infected structures coming into contact with the eye. (5) It has been reported that these diseases may occur as a first sign of the disease and sometimes during the progression of the disease. In previous studies, different conjunctival infections related to COVID-19 have been identified and the presence of SARS-CoV-2 in tear fluid has been demonstrated. Ocular structures may be a way of becoming infected and of infecting other people. (6)

The clinical manifestations are variable. Patients with mild symptoms usually recover quickly, while severe cases may develop progressive respiratory failure, potentially leading to death. Currently, reverse transcriptase-polymerase chain reaction PCR (RT-PCR) detection of the viral genome in the upper respiratory tract swabs is the most reliable diagnostic test. (7)

In various study done on the post covid patients most common ophthalmic manifestations were conjunctival congestion, discharge and episcleritis reportedly had them in immediate recovery phase while dry eyes with different grades of severity turned out to be the commonest ocular complaint, few patients presented with stromal keratitis, focal choroiditis and CSCR were documented within 2 months of corona recovery period.

Although no such direct correlation has been formed till date between covid 19 and the ocular changes, this study aims at documenting the possible ocular diseases a patient can have during or after the recovery phase of the illness and the possible precautions and management for the same.

AIM AND OBJECTIVE

1. To study the ocular manifestation in post-covid 19 patients in tertiary medical centre

MATERIALS AND METHODS

A cross sectional study was performed in the Department of Ophthalmology, Narayan medical college Jamuhar, South Bihar during June 2020 to June 2021 on the patients visiting ophthalmic OPD with ocular complaints during or after the recovery phase of Covid 19. RT-PCR positivity was used as confirmation for covid 19. Patients were only included if they had a positive nasopharyngeal PCR for SARS-CoV-2 and presently non critical, asymptomatic. For each patient, age, gender, date of birth, past ocular history, ocular medications, day of symptom onset, ocular symptoms, physical examination, treatments for ocular symptoms, ventilation status. In addition, temperature, C-reactive protein (CRP), D-dimer, ferritin, and absolute lymphocyte count (ALC) were recorded. All patients who were discharged home and were able to self-monitor were followed up with telephonic survey. In the phone survey, patients were asked if they experienced any eye symptoms such as red eyes, eye discharge, eye swelling, or vision changes during the course of their COVID-19 illness or thereafter, the day of onset of any ocular symptoms, and any treatments received. Descriptive statistics were used to analyse data. All statistical analyses were performed using SPSS version 20.0 (SPSS Inc). Means for continuous variables were compared using independent-group t test when the data were normally distributed; otherwise, the Mann-Whitney test was used. Proportions for categorical variables were compared using the χ^2 and Fisher exact test as appropriate. For unadjusted comparisons, a 2-sided α of less than .05 was considered statistically significant

RESULTS

A total of 50 patients were included in the study. The mean age was 61.7 years (SD 15.5), 29 (58%) were male. The average hospital length of stay was 15.1 days (SD 14.9). Eleven (22%) patients had prior ocular history documented in their medical record, 32 (64%) patients experienced a fever during their admission, and 19 (38%) patients required mechanical ventilation. In total, 5 (10%) patients exhibited ocular signs and symptoms in this study. Among the 5 patients, 4 (80.0%) developed ocular abnormalities prior to day 30 of onset of COVID symptoms. One patient (20%) reported ocular symptoms as one of the initial manifestations of COVID-19, and on average, patients developed ocular signs and symptoms on day 17 (SD 15) of

onset of COVID-19 symptoms. The most common ocular abnormality was conjunctival injection, followed by vision changes and ocular irritation. Age, gender, presence of prior ocular history, fever during hospitalization, mechanical ventilation, and increasing inflammatory markers were not significantly associated with the presence or development of ocular symptoms.

Table 1 Characteristics of Patients with COVID-19

	Overall (N=50)	With Ocular Symptoms n=5	No Ocular Symptoms n=45	P-value
Age, mean (SD), y	61.7 (15.5)	59.2 (16.0)	61.9 (15.4)	0.2529
Male, No. (%)	29 (58)	3 (60)	24 (53.3)	0.1814
Fever, No. (%)	32 (64)	4 (80)	28 (62.2)	0.1167
Prior ocular history, No. (%)	10 (20)	2 (40)	9 (20)	0.1110
Mechanical ventilation, No. (%)	20 (40)	2 (40)	17 (37.7)	0.2813

Table 2 Characteristics of Hospitalized Patients with COVID-19

	Overall (N=50)	With Ocular Symptoms n=5	No Ocular Symptoms n=45	P-value
CRP, mg/dL	9.5 (5.7)	9.6 (6.7)	9.4 (5.6)	0.5265
D-Dimer, mg/L	1.8 (0.9)	1.8 (1.0)	1.8 (0.9)	0.9919
Ferritin, ng/mL	942.1 (435.9)	777.4 (532.1)	944.7 (435.9)	0.9008
ALC, K/uL	1.1 (0.8)	1.0 (0.8)	1.1 (0.9)	0.5400

Table 3 Distribution of Ocular Signs and Symptoms

Signs and Symptoms	With Ocular Symptoms (%)
Overall	5 (10)
Conjunctival injection	2 (40)
Vision changes	1 (20)
Irritation	1 (20)
Discharge	1 (20)

DISCUSSION

Age

In the present study the mean age of patients with ocular symptoms was 59.2 (SD 16.0) and in patients with no ocular symptoms 61.9 (SD 15.4). Mean age was 67 years in a study by **Ping Wu** et al (2020)(8). In a study by **Hasan Öncület** al (2020)(6) the mean age of the patients was 58.5 years (20–91). mean age $\pm$ standard deviation was 63 years $\pm$ 14 in a study by **Augustin Lecler** et al (2021)(4). In a study by **Scalinci** et al. (2020)(9) mean age of patients was 46.8 years.

Gender

In the current study 29 (58%) cases were male. In a study by **Hasan Öncület** al (2020)(6) 197 (54.9%) were male and 162 (45.1%) were female. In a study by **Augustin Lecler** et al (2021)(4) out of total of 129 patients (43 of 129 [33%] women and 86 of 129 [67%] men. Of the 93 COVID-19 patients, in a study by **Basak Bostanci Ceran** et al (2020)(1) 54 (58.1%) were male, and 39 (41.9%) were female.

Fever

In this study fever was reported in 80% cases with ocular symptoms and 62.2% patients with no ocular symptoms. In a study by **Hasan Öncület** al (2020)(6) 64 (17.8%) of the patients were admitted to the hospital with fever. Of the 93 COVID-19 patients, in a study by **Basak Bostanci Ceran** et al (2020)(1) Twenty (21.5%) patients had fever.

Mechanical ventilation

In the current study 20 (40%) patients required mechanical ventilation. In a study by **Hasan Öncület** al (2020)(6) 16.9% of the 65 patients treated in the ICU received respiratory support with a mechanical ventilator. 35.9% in a study by **İlen Ferreira Costa** et al (2021)(10) needed invasive mechanical ventilation.

Stay in hospital

In the present study Thirty two (64%) patients were discharged home, 9 (18%) were discharged to a rehabilitation facility, and 9 (18.0%) were transitioned into hospital care or passed away. In a study by **Hasan Öncület** al (2020)(6) two hundred ninety-four (81.9%) patients were treated in the in-patient clinic and 65 (18.1%) patients were treated in the ICU. In a study by **İlen Ferreira Costa** et al (2021) (10) 57 (89.0%) required hospitalization and oxygen support, 29 (45.3%) required intensive care.

Time of ocular symptoms

Among the 5 patients in the present study 4 (80%) developed ocular abnormalities prior to day 30 of onset of COVID symptoms. One patient (20%) reported ocular symptoms as one of the initial manifestations of COVID-19, and on average, patients developed ocular signs and symptoms on day 17 (SD 15) of onset of COVID-19 symptoms. In a study by **İlen Ferreira Costa** et al (2021)(10) the mean $\pm$ SD duration of hospitalization was 15.0 $\pm$ 10.7 days. The mean $\pm$ SD interval (days) between the onset of COVID-19 symptoms and the day the ophthalmology team evaluated them was 82 $\pm$ 36.4 days. Mean duration between COVID-19 symptoms/diagnosis and ophthalmic symptoms in a study by **Sindhuja** et al. (2020)(11) was 9.4 days. **Hong** et al. (2020) (12) observed ocular symptoms in initial 6 days of covid.

Ocular Signs and Symptoms

In total, 5 (10%) patients exhibited ocular signs and symptoms in this study. Among the 5 patients, 4 (80.0%) developed ocular abnormalities prior to day 30 of onset of COVID symptoms. One patients (20%) reported ocular symptoms as one of the initial manifestations of COVID-19, and on average, patients developed ocular signs and symptoms on day 17 (SD 15) of onset of COVID-19 symptoms. In a study by **Ping Wu** et al (2020)(8) a total of 12 of 38 patients (31.6%; 95% CI, 17.5-48.7) had ocular manifestations consistent with conjunctivitis, including conjunctival hyperemia, chemosis, epiphora, and increased secretions. **Naser Nasiri** et al (2021)(13) recorded that the most prevalent ocular manifestations were dry eye or foreign body sensation (n = 138, 16.0%), redness (n = 114, 13.3%), tearing (n = 111, 12.8%), itching (n = 109, 12.6%), eye pain (n = 83, 9.6%), and discharge (n = 76, 8.8%). In a study by **Hasan Öncület** al (2020)(6) the rate of ocular diseases in all patients was 4.5%. Conjunctivitis was the most common ocular disease in patients with COVID-19. The rate of presenting to the hospital with conjunctival hyperemia was observed to be 0.7% (n = 4) in the study of **Chen** et al (2020)(14) consisting of 535 patients.

CRPa, mg/dL

In the present study CRP 9.6 (6.7, 14.5) in patients with ocular manifestations and 9.4 (5.6, 14.6) in patients with no ocular manifestations. In a study by **Ping Wu** et al (2020)(8) CRP was 8.55 (8.87) in patients with ocular manifestations and 3.61 (4.02) in patients with no ocular manifestations. In a study by **Hasan Öncület** al (2020)(6) CRP value was 57.62 $\pm$ 51.04 mg/L (median: 39) in patients without conjunctivitis (n = 349), and 68.05 $\pm$ 42.34 mg/L (median: 64.45) in patients with conjunctivitis (n = 10). **Basak Bostanci Ceran** et al (2020) (1) found that Patients with ocular involvement were more likely to have increased CRP (p < 0.001).

D-Dimera, mg/L

In this study D-Dimer 1.8 (1.0, 4.6) in patients with ocular manifestations and 1.8 (0.9, 5.3) in patients with no ocular manifestations. In a study by **Ping Wu** et al (2020)(8) 2.96 (3.93) in patients with ocular manifestations and 1.35 (1.53) in patients with no ocular manifestations. In a study by **Hasan Öncület** al (2020)(6) D-Dimer value was 442.9 $\pm$ 513.5 in patients without conjunctivitis. **Basak Bostanci Ceran** et al (2020)(1) recorded mean D-Dimer in patients with ocular manifestations was 1314.2 $\pm$ 611.3.

CONCLUSIONS

This study was conducted to assess the ophthalmic manifestation in post-covid patients. In total, 5 (10%) patients exhibited ocular signs and symptoms in this study. Majority of study subjects developed ocular abnormalities within day 30 of onset of COVID symptoms. The most common ocular abnormality was conjunctival injection, followed by vision changes and ocular irritation.

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