



OCULAR MANIFESTATIONS OF HOSPITALIZED COVID -19 PATIENTS IN ICU, ZORAM MEDICAL COLLEGE – A CROSS SECTIONAL STUDY.

Ophthalmology

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ABSTRACT

Aims & Objectives: Studies have identified a wide range of ocular signs & symptoms in Coronavirus disease 2019 (Covid- 19) patients, however those studies were conducted outside North Eastern part of India. This study aim to investigate the ocular manifestations of COVID- 19 patients hospitalized in Intensive Care Unit, Zoram Medical College. To our knowledge, this is the first study that investigates the ocular manifestations among COVID- 19 patients requiring Intensive care in Northeastern part of India. **Materials & Methods:** A Retrospective, Cross Sectional Study was conducted on individuals who were hospitalized for COVID- 19 in Intensive Care Unit between 1st June 2021 and 15 July 2021. The health record was reviewed for all patients, and a follow up phone survey was conducted on patients who were discharged home. Data on patients history, physical examinations and laboratory results were collected and analyzed. **Results:** A total of 100 patients were included. The mean patient age was 48.43 years (SD 16.57) and 61 (61%) were males. Ocular signs and symptoms were noted in 12 (12 %) patients. The most common ocular abnormality was vision changes followed by conjunctival injection and ocular irritation. All 12 patients, developed ocular involvement after discharge from the hospital. Univariate analysis showed that age, gender, ocular history, fever, mechanical ventilation, duration of hospital stay and increasing inflammatory markers were not significantly associated with the presence or development of ocular symptoms. **Conclusion:** In this study, 12 % of hospitalized COVID-19 patients exhibited ocular signs and symptoms. Factors associated with severe systemic COVID-19 disease were not associated with developing ocular abnormalities. The rate of ocular manifestations of COVID-19 should not be ignored, and thus physicians should routinely evaluate for ocular involvement in hospitalized COVID-19 patients.

KEYWORDS

COVID-19, conjunctivitis, ocular manifestations, ocular surface

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, supporting conjunctivitis as an ocular manifestation of SARS-CoV-2 infection.

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.

Coronaviruses can cause severe ocular disease in animals, including anterior uveitis, retinitis, vasculitis, and optic neuritis in feline and murine species. However, ocular manifestations in humans are typically mild and rare,⁵ although there are increasing numbers of associated ocular findings in patients positive for the COVID-19.

Patients and Methods

We conduct a Retrospective, Cross Sectional Study on individuals who were hospitalized for COVID- 19 in Intensive Care Unit between 1st June, 2021 and 15 July, 2021. The study was approved by the Institutional Research Committee, Zoram Medical College. Patient consent was obtained for all participants through phone survey. All patient-protected health information remained confidential in this study. Patients were only included if they had a positive nasopharyngeal PCR for SARS-CoV-2. For each patient, following information from the health record: age, gender, date of birth, date of service, length of stay, past ocular history, ocular medications, day of symptom onset, ocular symptoms, ocular physical exam, treatments

for ocular symptoms, ventilation status, and disposition was extracted. 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, the day of onset of any ocular symptoms, and any treatments received. Our study aim to investigate the ocular manifestations of COVID- 19 patients hospitalized in Intensive Care Unit, Zoram Medical College.

RESULTS:

A total of 100 patients were included. The mean patient age was 48.43 years (SD 16.57) and 61(61%) were males. The youngest patient included in the study is 21 years old while the oldest is 93 years old. Ocular signs and symptoms were noted in 12 (12 %) patients. The most common ocular abnormality was vision changes followed by conjunctival injection and ocular irritation. All 12 patients, developed ocular involvement after discharge from the hospital. Analysis showed that age, gender, ocular history, fever, mechanical ventilation, duration of hospital stay and increasing inflammatory markers were not significantly associated with the presence or development of ocular symptoms.

Table 1 : Age Of The Patient

AGE OF THE PATIENT	NUMBERS
21-30	15
31-40	28
41-50	17
51-60	14
61-70	16
71-80	7
81-90	2
91-100	1
TOTAL	100

The mean length of hospital stay was 10.62 days. The shortest stay in ICU among the subjects was for 1 day whereas the longest stay in ICU was for 40 days. All patients were on oxygen support and 41 (41 %) patients required mechanical ventilation. 1 patient died in ICU, 99 (99%) patients were discharged home.

Table 2: Days Of Hospital Stay

DAYS	NUMBERS
0-10	65
11-20	27
21-30	5
31-40	3
TOTAL	100

Based on phone survey, 12 patients exhibited ocular signs and symptoms. Among the 12 patients, 6 (50 %) patients developed blurring of vision, 4(33%) patients complained of conjunctival congestion, 2(17%) patients complained of itching and increased watering of the eyes. There was no difference in the age, gender, presence of prior ocular history, fever during hospitalization, mechanical ventilation, and inflammatory marker levels between patients with and without ocular signs and symptoms. The most common ocular abnormality was vision changes, followed by conjunctival injection and ocular irritation.

Table 3 : Ocular Symptoms

OCULAR SYMPTOMS	NUMBERS
BLURRING OF VISION	6
CONJUNCTIVAL INJECTION	4
ITCHING AND INCREASED WATERING	2
TOTAL	12

DISCUSSION

To our knowledge, this is the first study that investigates the ocular manifestations of COVID-19 patients hospitalized in Intensive Care Unit in Northeastern part of India. Prior published reports on the ocular manifestations of COVID-19 patients have mostly originated from Asia and Europe. Our study demonstrates that 12 % of hospitalized patients exhibited ocular abnormalities. Similar to previous studies, common ocular manifestations in our cohort were signs and symptoms consistent with conjunctivitis, such as conjunctival injection and increased watering⁶. However, vision changes were also noted to be a prominent symptom, found in 50 % of patients with ocular abnormalities. While the etiology of vision changes was not elucidated due to limited record documentation and details from patient report, possible mechanisms could include ocular surface abnormalities or retinal pathology, as previously reported.⁷

In this study, we assessed whether there were significant differences between patients with and without ocular abnormalities. Previous studies have suggested that patients with ocular symptoms have higher CRP and lymphocyte counts and were also more likely to be older and have fever, suggesting that patients with ocular symptoms were likely to have more severe COVID-19 disease.⁸ However, our cohort did not show this association. To further address this question, we also used mechanical ventilation and other inflammatory markers such as D-dimer and ferritin as proxies for disease severity and found no difference in these factors between patients with and without ocular symptoms. The difference in the results between our study and prior studies could be due to differences in COVID-19 severity, and/or variations in data collection and patient setting, as prior reports were mostly conducted outside India.

Furthermore, markers of disease severity such as fever, mechanical ventilation, and increasing inflammatory markers were also not associated with the development of ocular symptoms.

In this study, 50% (19) of the patients who developed ocular signs and symptoms were captured through phone call follow-up only, and ocular abnormalities were not documented during their hospital stay. It is possible that physicians caring for hospitalized COVID-19 patients may have missed these concerns during their evaluation. When caring for COVID-19 patients, physicians may often elect to conduct a focused history over the phone or examine the patient from outside the room due to the risk of transmission and the related need to conserve personal protective equipment. However, emerging evidence suggests that extrapulmonary manifestations of COVID-19 are frequently encountered and should not be ignored.⁹

Our study has several limitations. First, the majority of patients in the study were not examined by an ophthalmologist and documented ocular exams were most often performed by emergency medicine, internal medicine, or anesthesiologist. Due to this limitation, it is likely that minor ophthalmic events were missed or not reported given lack of detailed ophthalmic exams. In order to maintain the integrity of the

data, the original descriptions of ocular abnormalities as documented and reported were unchanged. As a retrospective study, a causal association cannot be made between the presence of ocular symptoms and COVID-19. However, our observations are clinically important and suggest that in addition to direct ocular manifestations caused by SARS-CoV-2, indirect ocular symptoms can also occur in COVID-19 patients, warranting thorough eye exams by providers. Our study was also subject to selection bias, as we were only able to conduct follow-up phone calls to patients who were discharged home. It is possible that the rate of ocular manifestations may increase had we been able to follow-up with more patients, as our study suggests that record review alone may be insufficient to capture all of the ocular signs and symptoms experienced by patients.

CONCLUSION

As the pandemic continues, it is important for physicians and the general public alike to understand the manifestations of COVID-19. Given previous detection of viral RNA in conjunctival secretions, transmission of SARS-CoV-2 through ocular secretions cannot be ignored. Overall, our results suggest that the rate of ocular signs and symptoms of COVID-19 should not be ignored, although factors associated with the development of ocular signs and symptoms are still unclear.

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