

Characteristics of ocular findings of patients with Coronavirus disease 2019 (COVID-19) in Jhansi, U.P., INDIA A report from the COVID-19 Frontline.

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Abstract

Aim-To study the ocular manifestations in clinically confirmed COVID-19 patients from Jhansi district, U.P., India.

Methods- This is a prospective observational study, in which 40 patients with clinically confirmed COVID-19 infection, treated from May 15 to June 15, 2020, at MLB medical college and hospital, Jhansi, a tertiary health centre were studied for ocular manifestations. During the period of admission, the ocular signs and symptoms were noted.

Results- Out of the 40 included patients who tested positive by RT-PCR for SARS-CoV-2 on nasopharyngeal swabs, 27 showed respiratory symptoms and out of them only 9 had ocular symptoms consistent with conjunctivitis, including conjunctival hyperemia, chemosis, increased secretion or epiphora.

Conclusions- In this study, about one-fourth of patients with COVID-19 had ocular abnormalities that too were mild, which more commonly occurred in patients with respiratory disease.

Keywords- COVID-19, conjunctivitis, ocular symptoms, chemosis, epiphora

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I. Introduction

Coronaviruses are a group of related RNA viruses that cause diseases in mammals and birds. In humans, these viruses cause respiratory tract infections that can range from mild to lethal. Coronaviruses constitute the subfamily Orthocoronavirinae, in the family Coronaviridae, order Nidovirales, and realm Riboviria. They are enveloped viruses with a positive-sense single-stranded RNA genome and a nucleocapsid of helical symmetry. The genome size of coronaviruses ranges from approximately 26 to 32 kilobases, one of the largest among RNA viruses.^[1] They have characteristic club-shaped spikes that project from their surface, which in electron micrographs create an image reminiscent of the solar corona, from which their name derives.^[2]

The coronavirus disease 2019 (COVID-19), which originated from Wuhan in China, has spread to almost 200 countries across the globe. Since December 2019, coronavirus disease 2019 (COVID-19) has been reported among patients in China and since February in India and has become a global pandemic caused by the highly transmissible severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).^[3] Direct contact with mucous membranes, including the eye, is a suspected route of transmission. Recent studies have reported that this novel coronavirus strain may produce conjunctival findings and can be detected in tears and conjunctival secretions.

Epidemiology- In 2003, it was severe acute respiratory syndrome coronavirus (SARS-CoV), that affected 8,422 individuals and resulted in 916 deaths globally.^[4] Later it was Middle East respiratory syndrome (MERS-CoV) outbreak first identified in Saudi Arabia and Jordan in 2012, which infected 2,499 individuals and caused 858 deaths^[5]. More recently, in December 2019, a new CoV outbreak, known as severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), occurred in Wuhan in the Hubei province of China, which was declared as a pandemic by the World Health Organization (WHO).^[6,7]

The first case of COVID-19 in India, which originated from China, was reported in Kerala on 30 January 2020. As of present, 1 million confirmed cases with 25,000 deceased and still increasing have been reported.

Pathophysiology- The potential of infection through ocular secretions is currently unknown, and it remains unclear how SARS-CoV-2 accumulates in ocular secretions. Possible theories include direct inoculation

of the ocular tissues from respiratory droplets or aerosolized viral particles, migration from the nasopharynx via the nasolacrimal duct, or even hematogenous spread through the lacrimal gland.[8]

Symptoms-COVID-19 affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization.

Most common symptoms:

- fever.
- dry cough.
- tiredness.

Less common symptoms:

- aches and pains.
- sore throat.
- diarrhoea.
- conjunctivitis.
- headache.
- loss of taste or smell.
- a rash on skin, or discolouration of fingers or toes.

Serious symptoms:

- difficulty breathing or shortness of breath.
- chest pain or pressure.
- loss of speech or movement.

Ocular symptoms-Patients infected with SARS-CoV-2 can present with symptoms of conjunctivitis, including eye redness, ocular irritation, foreign body sensation, tearing, and chemosis. These symptoms have more commonly affected patients with severe systemic symptoms of COVID-19, though they can rarely present as an initial manifestation of the disease.[9]

Examination findings include those consistent with mild follicular conjunctivitis, including unilateral or bilateral bulbar conjunctiva injection, follicular reaction of the palpebral conjunctiva, watery discharge, and mild eyelid edema. Bilateral chemosis alone may represent third-spacing in a critically ill patient rather than a true ocular manifestation of the virus.

There have been no reports of COVID-19 patients experiencing blurred vision, sub-conjunctival hemorrhage, eyelid ecchymosis, conjunctival scarring, keratitis, or pseudomembrane formation.

II. Materials And Methods

From 15 May to June 15,2020,40 patients with clinically confirmed COVID-19 disease hospitalized in MLB medical college and hospital, Jhansi were evaluated for ophthalmic symptoms. Ocular adnexa, eyelids, conjunctiva and cornea were examined using diffuse torchlight illumination and slit beam filters of direct ophthalmoscope, corneal staining was done using fluorescent staining strips and examined with cobalt blue filter of direct ophthalmoscope.

Study Design-Prospective observational study

Study Location-This was a tertiary care teaching hospital based study done in Department of Ophthalmology, at Maharani Laxmi Bai medical college, Jhansi, Uttar Pradesh.

Study Duration-15 May 2020 to 15 June 2020

Sample Size-40 patients.

Inclusion criteria-All clinically confirmed cases of covid 19 irrespective of age and gender admitted from the time period 15 May to 15 June in the isolation ward of MLB medical college, Jhansi.

Exclusion criteria-

1. Patients with pre existing eye lid, corneal, conjunctival or anterior segment pathology.
2. Patients with history of allergies.
3. Patients with h/o previous ocular surgeries.

Limitations-This study has many limitations. Sample size is limited to 40 patients, slit lamp biomicroscopy and detailed ocular examinations could not be performed to confirm conjunctival and intraocular disease. Without discrete biomicroscopic exams, the findings of conjunctival hyperemia, chemosis, epiphora and secretions could be nonspecific and not necessarily clear-cut manifestations of conjunctivitis.

III. Results

Out of the 40 consecutive patients with COVID-19 who were included in the study,27(67.5%)were male and 13(32.5%) were female and all of them tested positive on RT-PCR from nasopharyngeal swabs.27 of them showed fever and /or respiratory symptoms and the rest 13 were asymptomatic patients. Out of the 27

symptomatic patients, 9 patients had ocular manifestations consistent with conjunctivitis, including conjunctival hyperaemia, chemosis, epiphora, increased secretions and mild lid swelling. None of them experienced blurred vision. None of the asymptomatic patients had ocular manifestations.

Table.Characteristics of 9 patients with ocular manifestations

Patient no./Sex/Age,yrs	Temperature at ocular examination, in °C	Respiratory symptoms	Ocular manifestations
1/M/78 yrs	38.0	Dyspnoea	Conjunctival hyperemia, chemosis, epiphora, secretion
2/M/49 yrs	38.0	Cough , expectorate	Chemosis, epiphora, secretion
3/F/80yrs	39.9	Cough, expectorate	Conjunctival hyperemia, secretion
4/M/36yrs	36.8	Cough	Epiphora
5/F/40 yrs	39.0	Cough	Chemosis
6/F/28yrs	38.1	Nasal congestion	Secretion
7/M/55yrs	37.6	Chest congestion	Chemosis, epiphora, secretion
8/M/25yrs	38.2	Cough	Chemosis, epiphora, secretion
9/M/69yrs	38.7	Dyspnoea	Conjunctival hyperemia, secretion

IV. Discussion

Our study suggests that among patients with COVID-19, 22.5% (9 out of 40) have ocular abnormalities, with most among patients with systemic manifestations or severe respiratory disease .These results suggest that ocular symptoms commonly appear in patients with pneumonia. Only ocular symptoms are not encountered and no vision threatening eye disease was reported.

Limitations of this study include a relatively small sample size and absence of detailed ocular examinations to exclude intraocular disease owing to the logistical challenges of managing these patients at this time. Regardless, these preliminary results are shared in an effort to inform ophthalmologists and others around the world regarding ocular symptoms with COVID-19.

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