



OCULAR MANIFESTATIONS IN LABORATORY CONFIRMED COVID-19 CHILDREN IN A TERTIARY CARE HOSPITAL IN INDIA

Ophthalmology

Dr. Dinesh Kumar	Junior Resident, Department Of Pediatrics, SMS Medical College, Jaipur (Rajasthan)
Dr. Chanchal Gupta	Senior Resident, Department Of Ophthalmology, SMS Medical College, Jaipur (Rajasthan)
Dr. Mahesh Kumar Gupta	Junior Resident, Department Of Pediatrics, SMS Medical College, Jaipur (Rajasthan)
Dr. Vishnu Agarwal*	Associate Professor, Department Of Pediatrics, SMS Medical College, Jaipur (Rajasthan). *Corresponding Author

ABSTRACT

BACKGROUND- Scarce literature has been published thus far regarding ocular findings in the COVID-19 pediatric population. Therefore, we aimed to share our experience in managing children with ocular involvement possibly related to COVID-19 disease.

METHODS- Laboratory-confirmed children with COVID-19 admitted in RUHS hospital, Jaipur (Rajasthan), which was the only designated hospital for treating children 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.

RESULTS- Overall, 22 patients (22.00%) had various ocular symptoms during COVID-19 infection. Among those with ocular symptoms, 18 patients (81.81%) presented with increased conjunctival discharge, including white mucoid (5 [22.72%]), thin watery (3 [13.64%]) and yellow-green purulent (10 [45.46%]) discharge, and with conjunctival congestion (2 [9.09%]). Other ocular manifestations contained ocular pain (3 [13.64%]), tearing (1 [4.54%]), and eyelid swelling (1 [4.54%]).

CONCLUSION- We concluded that common ocular manifestations were conjunctival discharge, eye rubbing, and conjunctival congestion. COVID-19 in children was typically not severe, and all ocular symptoms were mild and could recover or improve eventually.

KEYWORDS

COVID-19, Children, Eye.

INTRODUCTION

Children account for 1% of cases of COVID-19 in most published series, with significantly reduced risk of developing severe forms of disease or death.¹ Because most children present with mild forms of acute respiratory infections, interest has been focused initially on children with underlying/comorbid diseases and concentrated rare fatalities.²

In children with active COVID-19, the most common clinical manifestations are fever and cough, sometimes accompanied by fatigue, myalgia, rhinorrhoea, sneezing, sore throat, headache, dizziness, diarrhoea, vomiting, and abdominal pain.³ Dyspnea is more common in adults and has been described in more than 20% of patients, although lower respiratory tract infection can also develop in children.⁴ Conjunctival congestion is the most common ocular manifestation described, although it is rarely mentioned in non-ophthalmology-specific studies. However, it is present in 1 to 5% of adults, consistent with mild follicular conjunctivitis without pseudomembrane formation. Concern with COVID-19 in children began when they started to develop a wide range of manifestations from chilblains, to a severe pediatric inflammatory multisystem syndrome (PIMS) mimicking Kawasaki disease (KD).⁵

Scarce literature has been published thus far regarding ocular findings in the COVID-19 pediatric population. Therefore, we aimed to share our experience in managing children with ocular involvement possibly related to COVID-19.

MATERIAL AND METHOD

Laboratory-confirmed children with COVID-19 admitted in RUHS hospital Jaipur, which was the only designated hospital for treating children 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 labatory 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 etiology 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 categorical 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 children were included, of which 22 participants (22.00%) reported ocular symptoms.

Table 1. Patients characteristics

Age in yrs	8.12±3.16
Male : Female	62 : 38
BMI in kg/m ²	22.32±3.21
Patients with ocular manifestations	22/100 (22.00%)

Table 2. Ocular Manifestations in Children With Confirmed COVID-19 (n=22)

Conjunctival discharge	18(81.81%)
White mucoid discharge	5(22.72%)
Thin watery discharge	3(13.64%)
Yellow green purulent discharge	10(45.46%)
Conjunctival congestion	2(9.09%)
Ocular pain	3(13.64%)
Tearing	1(4.54%)
Eyelid swelling	1(4.54%)

Overall, 22 patients (22.00%) had various ocular symptoms during COVID-19 infection. Among those with ocular symptoms, 18 patients (81.81%) presented with increased conjunctival discharge, including white mucoid (5 [22.72%]), thin watery (3 [13.64%]) and yellow-green purulent (10 [45.46%]) discharge, and with conjunctival congestion (2 [9.09%]). Other ocular manifestations contained ocular pain (3 [13.64%]), tearing (1 [4.54%]), and eyelid swelling (1 [4.54%]).

DISCUSSION

To our knowledge, large case series of ocular manifestations of COVID-19 in children have not been reported. This study included the largest sample size on ocular manifestations in children with COVID-19, to our knowledge. Among 100 participants, 22 (22.00%) 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 nasolacrimal duct. 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. COVID-19 in children was typically not severe, and all ocular symptoms were mild and could recover or improve eventually.

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