

Recurrent keratoconjunctivitis as the sole manifestation of COVID-19 infection: A case report

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Abstract

Introduction: Ocular symptoms are uncommon manifestations of coronavirus disease 2019 (COVID-19) infection. Earlier study reported that dry eye, blurred vision, foreign body sensation, tearing, itching, conjunctival secretion, conjunctival congestion, ocular pain, and photophobia are among the ocular symptoms that could be found in COVID-19 patients. However, there are only a few reports available regarding corneal involvement in this disease. Here we report a case of keratoconjunctivitis as the only symptom of COVID-19 infection.

Case description: A 27-year-old man who worked as an obstetrics and gynecology resident came to the outpatient clinic with the chief complaints of eye discomfort, foreign body sensation, conjunctival hyperemia, lacrimation, and photophobia in his right eye for the past 3 weeks. Fluorescence test showed a small corneal lesion. The patient was then diagnosed with keratoconjunctivitis. A week after the treatment, all symptoms were resolved. A month later, the patient came to the emergency room with the same eye complaints but with a more severe pain. The fluorescence test showed wider corneal lesion compared to last month. The result from the corneal swab is negative for bacterial or fungal infection, indicating a viral infection. Afterwards, reverse transcriptase polymerase chain reaction test from nasopharyngeal swab was performed and revealed that the patient was positive for COVID-19.

Conclusions: This case report showed that keratoconjunctivitis may occur as the only manifestation of COVID-19 infection. Thus, patient presented with unexplainable eye symptoms should be evaluated for COVID-19 infection.

Keywords

Case report, COVID-19, keratoconjunctivitis, ocular Infection, SARS-CoV2

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Introduction

In December 2019, a pneumonia caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV2), known as coronavirus disease 2019 (COVID-19), is first detected in Wuhan City, the capital of Hubei Province, China. Given the severity of this disease and increasing number of cases due to its fast spread, on 30 January 2020 WHO declared a public health emergency of international concern. On 11 March 2020, WHO characterized COVID-19 as a pandemic.¹

Ocular symptoms are uncommon manifestations of COVID-19 infection. Recent meta-analysis study showed that the prevalence of ocular symptoms is 5%.² Earlier study

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reported that dry eye, blurred vision, foreign body sensation, tearing, itching, conjunctival secretion, conjunctival congestion, ocular pain, and photophobia are among the ocular symptoms that could be found in COVID-19 patients.³ However, there are only a few reports available regarding corneal involvement in this disease. Here, we report a case of recurrent keratoconjunctivitis as the only symptoms of COVID-19 infection. The patient gave written informed consent for the use of clinical records and pictures included in this case report.

Case description

On 9 April 2020, a 27-year-old man who worked as an obstetrics and gynecology resident came to the outpatient clinic at the tertiary referral hospital where he worked on with the chief complaints of eye discomfort, foreign body sensation, conjunctival hyperemia, lacrimation, and photophobia in his right eye for the past 3 weeks (Figure 1(a)). The eye complaints improved when treated with artificial tears. On physical examination, he had 6/6 visual acuity on both eyes. Anterior segment examination of the affected eye showed conjunctival hyperemia with pericorneal vascular injection. Fluorescence test showed geographic shape in the epithelial layer with 3 × 3 mm in size and several punctate lesion at the inferior part of the cornea on the affected eye (Figure 1(b)). From the anterior chamber there was no sign of flare, cell, or keratic precipitate. The patient was diagnosed with keratoconjunctivitis and treated with polymyxin sulphate-neomycin sulphate-gramicidin eye drop thrice daily and artificial tears. A week later, all symptoms were resolved.

On 5 May 2020, the patient came to the emergency room with the same eye complaints as the previous month. However, the pain was more severe, followed by an additional symptom of blepharospasm. This pain occurred just recently after he assisted an emergency cesarean section. On physical examination, he had 6/9 visual acuity on the right eye. An anterior segment examination of the affected eye showed pericorneal vascular injection with positive fluorescein test that was wider compared to last month result. The depth of the lesion was as deep as the epithelial layer, 6 × 6 mm in size, and located at the central cornea (Figure 1(c)). There was no sign of inflammation on the anterior chamber. Corneal sensibility was normal. The corneal scrapping was then performed. The patient was treated with artificial tears and polymyxin sulphate-neomycin sulphate-gramicidin eye ointment thrice daily.

Three days later (8 May 2020), the corneal scrapping result came out and it was negative for bacterial or fungal. Thus, this symptoms were suspected to be due to viral infection. The patient was then treated with eye bandage, cycloplegic eye drop twice daily, and artificial tears. Because of the suspected viral infection, the patient was suspected to be

infected with SARS-CoV2. However, SARS-CoV2 detection using reverse transcriptase polymerase chain reaction (RT-PCR) from eye swab could not be performed because there was no facility for that in our hospital. Thus, nasopharyngeal swab was performed on the next day (9 May 2020). While waiting for the test result to come out, the patient was asked to stay at home and only went to the hospital for his eye evaluation. Three days later (11 May 2020), the eye symptoms resolved, and the corneal lesion improved (Figure 1(d)). Two days later (13 May 2020), the lesion was nearly resolved (Figure 1(e)). Later on that day, the swab result came out and indicated that the patient was positive for COVID-19. The timeline of the disease course is shown in Figure 2.

Conclusions

The ocular symptoms of COVID-19 could present before, at the same time, or days to weeks after the systemic manifestation.³ Recent meta-analysis showed that 28% of ocular manifestation even appeared without any noticeable systemic manifestation by the patients.² In our case, the patient was found to be positive for COVID-19 due to the recurrent keratoconjunctivitis without any other symptoms. To this date, there were three published articles regarding the keratitis involvement in patients with COVID-19 ocular manifestation, and all of the articles were a case report (Table 1).⁴⁻⁶ However, all previously reported cases had systemic manifestation.

Other than the respiratory tract, ocular surface is known to be another port of entry for SARS-CoV2. Recently it has been discovered that angiotensin-converting enzyme 2 (ACE2) (a receptor for SARS-CoV2) and TMPRSS2 (a cell surface-associated proteases that facilitates viral entry following the binding with ACE2) are expressed on the conjunctival and corneal epithelial cells. From the ocular surface, SARS-CoV2 makes its way to the respiratory tract via nasolacrimal system or blood vessel. Moreover, SARS-CoV2 also able to cause a local inflammation to the ocular surface.⁷ However, the presence of ocular manifestation is found to be not related to the severity of the COVID-19 infection.² In our patient, there was no other symptoms in either initial or recurrent keratoconjunctivitis.

There are several possible predisposing factors for ocular manifestation of COVID-19, that is, frequent touching of the eyes with hands, aged above 60 years old, immunocompromised state, lacrimal duct abnormalities, swimming, and being a healthcare worker.² In this case, our patient was working as resident at the obstetrics and gynecology department. During this pandemic, he still assists many surgeries and do a round in the ward as usual. He did wear a personal protective equipment level 2 using N95 mask, but the eyes were only protected only with face shield and not with protective goggle. Thus, it might be suggested that using only face shield as eye protection for

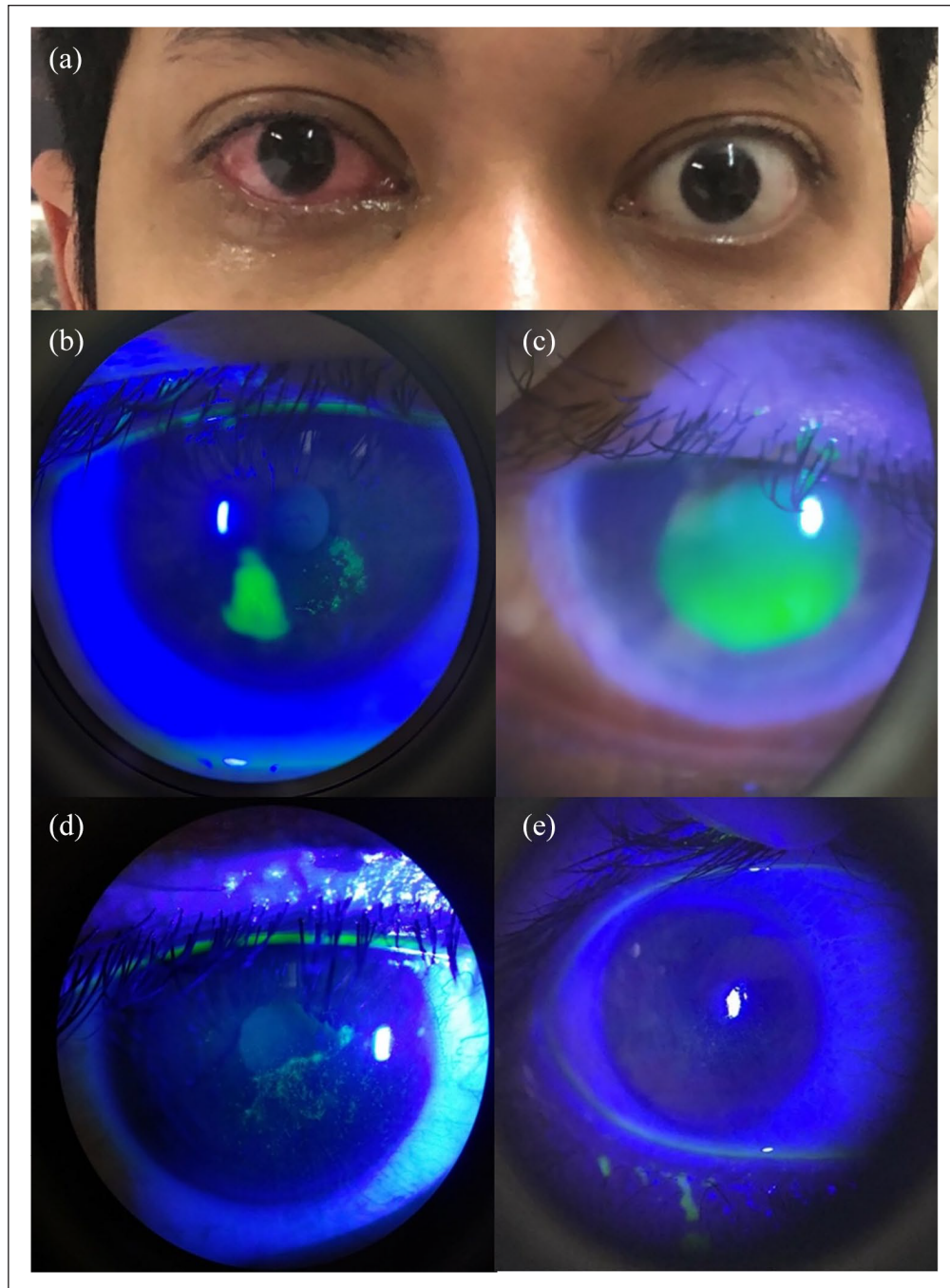


Figure 1. Eye image of the patient. Image taken on 9 April 2020 (a, b) showed: (a) unilateral eye redness, (b) slit lamp image on the right eye after stained with fluorescein and visualized under cobalt blue light showed geographic shape in the epithelial layer with 3×3 mm in size and several punctate lesion at the inferior part of the cornea on the affected eye, (c) slit lamp image taken on 5 May 2020 on the right eye after stained with fluorescein and visualized under cobalt blue light showed central corneal lesion as deep as the epithelial layer, 6×6 mm in size, (d) slit lamp image on the right eye taken on 11 May 2020 showed improvement of the corneal lesion after stained with fluorescein and visualized under cobalt blue light, and (e) slit lamp image on the right eye taken on 13 May 2020 showed nearly resolved corneal lesion after stained with fluorescein and visualized under cobalt blue light.

COVID-19 infection is not sufficient, and the use of protective goggle should be mandatory to all physician.

It might be argued that the recurrent keratoconjunctivitis in our patient can also be due to herpes simplex.

However, considering that the corneal sensibility was not affected, the diagnosis of herpes simplex was less likely. The recurrent ocular manifestation in COVID-19 patient has been reported previously. The initial manifestation

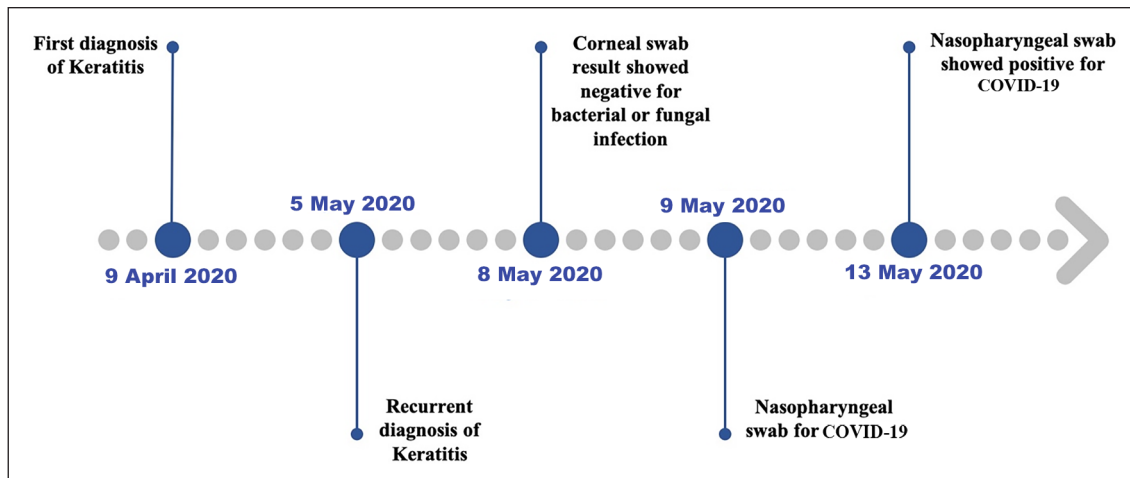


Figure 2. Timeline of the disease course.

Table 1. Reported cases of keratitis involvement in COVID-19 ocular manifestation.

Author	Age/sex	Location	Onset after systemic manifestation	Treatment
Guo et al. ⁴	53/Male	Both eyes	31 days	0.1% Fluorometholone drops four times daily
Cheema et al. ⁵	29/Female	Right eye	Same day	Oral valacyclovir 500mg three times daily and moxifloxacin drop four times daily
Navel et al. ⁶	63/Male	Both eyes	19 days	Azithromycin eye drop two times daily and low dose dexamethasone drop
Current report	27/Male	Right eye	No systemic manifestation	Artificial tears; polymycin sulfate, neomycin sulfate, and gramicidin eye drop/eye ointment; cycloplegic eye drop; eye bandage

is due to the local invasion and inflammation of SARS-CoV2, while the recurrent manifestation is due to the cytokine surge. Compared to the initial manifestation, the recurrent manifestation was reported to be aggravated and more widespread.⁴ This is similar to our finding, where the symptoms and the corneal lesion were worse in the recurrent manifestation.

In our report, we did not perform the RT-PCR from eye swab because our hospital did not have the facilities for that. However, considering that our patient had viral keratoconjunctivitis and also found to be positive of COVID-19 infection based on the RT-PCR evaluation from nasopharyngeal swab, it is difficult to exclude the possibility of COVID-19 as the etiology for the keratoconjunctivitis in our patient. Previous 2 out of 3 case reports also showed negative finding from the RT-PCR from the eye swab when there was a keratitis involvement.^{4,6} The proportion of positive RT-PCR results from eye samples from patients with ocular symptoms were lower compared to the results from nasopharyngeal samples from all patients within the same study (16.7% vs 73.7%).⁸ It is suggested that lower positive rates from the eye samples evaluation is due to lower viral concentration, sample time lag, and

lower positive rate of RT-PCR itself.⁹ Compared with nasopharyngeal samples, eye samples is found to produce much lower signal in RT-PCR evaluation.^{5,10} Thus, patients with ocular manifestation may have positive SARS-CoV2 from nasopharyngeal samples but negative results from eye samples.

In conclusion, keratoconjunctivitis may appear as the only manifestation of COVID-19 infection. Patients presenting with unexplainable eye symptoms should be evaluated for COVID-19 infection. Wearing not only face shield but also protective goggle should be mandatory for all healthcare workers during their time in hospital regardless of their specialties, in order to prevent the infection via ocular surface.

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Supplemental material

Supplemental material for this article is available online.

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