

## Bilateral anterior uveitis as a part of a multisystem inflammatory syndrome secondary to COVID-19 infection

To the Editor,

During the ongoing coronavirus disease 2019 (COVID-19) pandemic, there is a global concern about patients presenting with inflammatory syndrome with variable clinical features. Colanfrancesco et al described COVID-19 systemic inflammatory reaction that are characterized by a life-threatening hyperinflammation sustained by a cytokines storm which eventually leads to multiorgan failure.

Previous studies observed an ongoing outbreak of Kawasaki-like multisystem inflammatory syndrome among children and adolescents that might be related to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) with a 30-fold increased incidence reported in Italy.<sup>2,3</sup>

The extent of these inflammatory reactions is yet not fully understood and to the best of our knowledge, no ocular manifestation has been reported in adults as a part of these inflammatory conditions related to SARS-CoV-2.

A 54-year-old female, with no significant past medical history, was admitted to the intensive care unit with fever, septic shock, gastrointestinal symptoms, heart failure, and a skin rash. During her hospitalization, a comprehensive workup was performed including infectious and autoimmune etiologies. The only relevant positive serology test was SARS-CoV-2 immunoglobulin G with negative polymerase chain reaction (PCR) COVID-19 from a nasopharyngeal swab. Blood urine and stool cultures were negative. With a diagnosis of multisystem inflammatory syndrome secondary to COVID-19 infection, she had been treated with corticosteroids, vasopressors, and antibiotics with clinical improvement. After 2 weeks, she was referred to our ophthalmology clinic for evaluation of the bilateral blurry vision. At the initial examination, her best corrected visual acuity was 20/40 on both eyes. Slit-lamp examination was remarkable for both eyes mild conjunctival hyperemia, central corneal edema with Descemet's membrane folds, and multiple keratic precipitates (KP's) distributed over the inferior half of the cornea, deep anterior chamber with +1 cells and +1 flare. Fundus examination revealed clear vitreous and a small focal intraretinal hemorrhage in the left fovea. Intraocular pressure measured with Goldmann tonometer was 12 mm Hg in both eyes. The ocular findings are shown in Figure 1. A fluorescein angiography did not display any vascular abnormality in both eyes. Under the diagnosis of bilateral acute anterior uveitis, the patient was treated with topical dexamethasone 0.1% and cycloplegia. Four days later, under this treatment, the patient felt a significant improvement, the best corrected visual acuity was 20/25 in both eyes, slit-lamp examination revealed clinical improvement with white conjunctiva, clear cornea few KP's, and a few cells in the anterior chamber.

This is the first documented case of bilateral acute anterior uveitis as a part of a multisystem inflammatory syndrome secondary to COVID-19 infection.

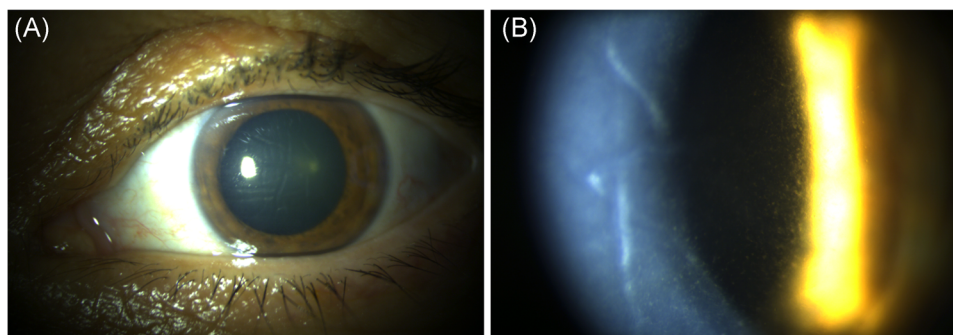
The clinical and presentation in the eye of the COVID-19 infection and its complications can vary and fluctuate and have not been widely studied yet. Recent studies showed that conjunctivitis could be a manifestation of COVID-19 and may be associated with a more severe form of the disease.<sup>4,5</sup> Coronaviruses are known to cause various ocular infections in animals, such as conjunctivitis, anterior uveitis, retinitis, and optic neuritis.<sup>6</sup> Cheema et al<sup>7</sup> presented recently a case of COVID-19 that presented initially to ophthalmology clinic with keratoconjunctivitis with small pseudodendrite and small subepithelial infiltrates in the cornea.

Ng et al<sup>8</sup> recently described pediatric inflammatory multisystem syndrome in three teenagers with serologically confirmed SARS-CoV-2 infection and a clinical presentation of fever, conjunctivitis, rash, gastrointestinal symptoms, and circulatory shock. Another group in Italy described a case of a clinically well 9-year-old patient with laboratory parameters strongly suggestive of a multiorgan involvement due to infection or inflammation with serologically confirmed SARS-CoV-2 infection.<sup>9</sup>

The multisystem inflammatory syndrome that has developed the patient seems to be clinically similar to a Kawasaki-like disease which is known in pediatric population. Shiari et al<sup>10</sup> reported 36.1% of acute anterior uveitis in children with Kawasaki disease and found an association between uveitis and coronary artery dilatation. Another study found that the presence of anterior uveitis is helpful in the early diagnosis and treatment of incomplete Kawasaki disease and can be used as an additional diagnostic tool.<sup>11</sup>

We postulate that the anterior uveitis was secondary to COVID-19 infection. It is important to report that the patient denied medical history of chronic autoimmune and inflammatory conditions. We cannot formally rule out other etiologies, particularly herpetic, since paracentesis was not performed. Regarding COVID-19, due to the limitation of ancillary resources when the pandemic was raging, we could not perform a swab PCR of the tears, yet it would probably have returned negative since the PCR of the nasopharyngeal swab was found to be negative three times.

We present this case of ocular involvement in a systemic inflammatory syndrome secondary to COVID-19 infection to emphasize the importance for the health care providers to be aware of the possible inflammatory ocular manifestation during and after a COVID-19 infection.



**FIGURE 1** Anterior segment findings at initial presentation. A, Corneal edema and descemet's membrane folds. B, High-magnification slit photography depicting corneal edema and keratic precipitates

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