

## The First Case of the Subretinal Abscess After Sars-CoV2 Infection

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**Abstract-** Ever since the new coronavirus has become the cause of the COVID-19 pandemic; it has manifested with unknown and new presentations. In this report, we are presenting a 46-year-old female infected with COVID-19 (confirmed by Reverse transcription polymerase chain reaction (RT-PCR) nasal swab test) and a known case of Diabetes mellitus type 2 who had a history of Intensive care units (ICU) admission due to COVID-19 with uncontrolled diabetes mellitus. In the second admission after recovery, she had blurred vision. Fundus examination revealed multiple yellow-white well-demarcated nonpigmented masses. Diagnosis of the multiple subretinal abscesses was confirmed. KOH-Calcofluor staining of vitreous fluid was negative for fungal infections of the eye. No polymorphonuclear leukocytes (PMN), epithelial cells, nor any organisms were detected. The patient was treated with an injection of the intravitreal Amphotericin B 10 µg/0.1 cc. To our knowledge, the presented case is the first case of the subretinal abscess after COVID-19 infection.

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**Keywords:** Subretinal abscess; Coronavirus disease 2019 (COVID-19); Severe acute respiratory syndrome coronavirus 2 (SARS-CoV2)

### Introduction

Events happened during the COVID-19 pandemic in a short period of time, large numbers of people in different parts of the world became infected with the virus, and different manifestations of the virus were reported. However, the Sars-CoV2 is transmitted mainly through droplets or contaminated surfaces (1). The main route of transmission of the virus is through the mouth and nose (1). Virus penetration through the mucosa of the eye can also be a route of transmission. It has now been shown that the coronavirus affects most organs in the body and that COVID-19 can have ocular complications (2). The mucous membrane of the eye is one of the ways the virus enters the human body, but it is not known exactly what percentage of infected people are infected through the eye; however, it is likely to be a very small percentage (2). In a previous coronavirus family outbreak in 2003, SARS-CoV was identified in tear samples (3). Conjunctival congestion was the main ocular manifestation of SARS-CoV2 patients (4). SARS-CoV2 inoculation to the eye is explained by various

hypothesizes of direct viral penetration to eye mucosa or migration from the nasopharynx or blood (2). In this study, we report an extensively rare ophthalmic manifestation of the eye in a severe case of COVID-19, presenting with subretinal abscess.

### Case Report

A 46-year-old female was diagnosed with COVID-19 (confirmed by RT-PCR nasal swab test) and was administered to the hospital two months ago. On her past medical history, she was known case of Diabetes mellitus type 2. Her manifestations at admission were dyspnea, cough, and fever. Uncontrolled diabetes mellitus was initially diagnosed with a blood sugar of 354 mg/dl. Her symptoms progressed, and she was admitted to ICU with a mean O<sub>2</sub> saturation of 60% on the 10th day of the admission. ICU admission was continued for 44 days, and she got improved and was discharged. She was readmitted 8 days later with lethargic signs that were associated with anemia (Hb=9.8 g/dl). Also, manifestations of blurred vision developed on the second

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day of the second admission.

A basic eye examination revealed visual acuity of CF2 in both eyes (count finger). Pupil function was normal with the normal size of the pupil. Ocular motility and Intraocular pressure (IOP) examinations were unremarkable. Fundus examination revealed multiple yellow-white well-demarcated nonpigmented masses in favor of the multiple subretinal abscesses (Figure 1). No intraretinal hemorrhages were seen. KOH-Calcofluor staining of vitreous fluid was negative for fungal infections of the eye. Also, no PMN, epithelial cells, nor any organisms were detected. RT-PCR of vitreous fluid was not done. The patient was treated with an injection of the intravitreal Amphotericin B 10 µg/0.1 cc; while follow up data are missing.

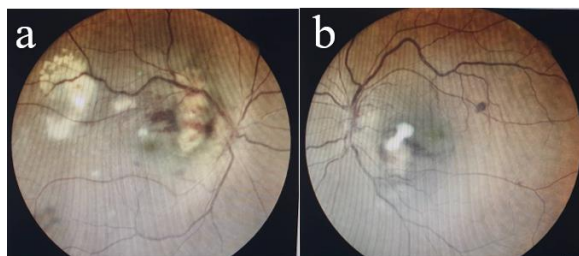


Figure 1. Fundus picture; (a) right eye, (b) left eye

## Discussion

Subretinal abscesses are exceedingly rare pathological entities of the eye. Yellow/creamy white well-circumscribed masses in the retina are described as subretinal abscesses (5), usually advancing to vision-threatening conditions, while notwithstanding surgical intervention and other treatments may require vitrectomy and retinectomy. Poor treatment outcomes, as well as extensive retinal detachment, are reported (6). Most subretinal abscesses are caused by bacterial infections like *Neisseria meningitidis*, *Staphylococcus aureus*, *Klebsiella*, or *Candida* (7,8); in our presented case, no bacterial or fungal organisms were detected. SARS-CoV2 is reported to be present in tears (9).

Our patient manifested with anemia. Severe anemia was seen in patient *Klebsiella* subretinal abscess as well as our study, suggesting the bad condition of the patients with subretinal abscess (7). abscess is seen The subretinal in immunocompromised patients. In the literature review, almost all reported case reports are patients with underlying conditions as well as HIV infected and therapeutically immunosuppressed individuals with

autoimmune conditions, post-transplant, or malignancies (10). It is well known that the virus can cause a severe inflammatory condition characterized by extensive secretion of the cytokines; cytokine storm in COVID-19 is associated with dysregulation of the immune system (11). Also, our patient was suffering from chronic diabetes mellitus. In a case reported by Kapoor *et al.*, an 80-year-old diabetic patient experienced a subretinal abscess (12). Also, a previous study in Jahrom city shows a high rate of diabetic patients among COVID-19 patients (13).

There is a two-way relationship between COVID-19 and diabetes. Diabetes is associated with an increased risk of severe COVID-19, and on the other hand, sudden diabetes and severe metabolic complications of diabetes, such as diabetic ketoacidosis, as our patient experienced on the first admission, may have consequences on the eye. As Oun and Lloyd reported, severe diabetic ketoacidosis may contribute to blindness (14).

Based on observations of people who develop diabetes spontaneously after becoming infected with SARS-CoV2 or people who have been hospitalized with very high blood sugar (15), researchers suggest that Diabetes not only makes people vulnerable to SARS coronavirus-2 but it may also trigger diabetic ketoacidosis in some people (16), which disrupts insulin production in the pancreas and reduces the ability of the liver and muscles to detect hormones.

About the pathogenesis of the subretinal abscesses, researchers have proposed that subretinal abscesses might be a suppurative inflammatory process that substituted the choroid and expanded across gaps in the pigment epithelium into the subretinal pigment epithelial space to the retina (17). While we didn't perform histological examinations in our study, there were no PMNs detected in vitreous fluid sampling. It might be due to the virological type of the disease. To our knowledge, there is no previous viral infection in the literature as the cause of the subretinal abscess.

Due to the novelty of this virus in the human population, new reports are being published daily regarding various aspects of its pathogenicity and symptomology. Symptoms such as fever, cough, fatigue, muscle aches, joint pain, and shortness of breath have been reported as classic signs of the disease. But in addition to these symptoms, COVID-19 also has other rare important extra pulmonary symptoms as well as ophthalmologic symptoms. Our presented case is the first case of the subretinal abscess after covid-19 infection.

Limitation of this study was no SARS-CoV-2 PCR

sampling in eye for evaluation of the direct presence of virus in the eye and no follow-up of the patient.

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## Consent for Publication

The authors attest to having gotten all necessary patient permission consents. The patient has provided her agreement for photos and other clinical information to be published in the journal by filling out the form. The patient was aware that her name and initials will not be published.

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