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LETTER TO THE EDITOR

# Branch retinal vein occlusion after COVID-19

*Occlusion de la veine rétinienne secondaire après COVID-19*

*Keywords* Retinal vein occlusion; COVID-19; SARS-CoV-2; Eye; Ophthalmology

Dear editor,

A 60-years-old woman was admitted to the emergency department of our center for evaluation of pneumonia, severe drowsiness and high fever (39.3 degrees Celsius). Soon after primary work-up including lung computed tomography scan and reverse transcriptase polymerase chain reaction analysis for COVID-19, she was hospitalized. Being positive for the tests, she was admitted in intensive care unit with the diagnosis of COVID-19 associated pneumonia and meningoencephalitis. After seven days, respiratory and mental status of the patient recovered and she was transferred to ward for further care.

On day 10, she reported sudden drop of vision in her left eye. In ophthalmic examination, visual acuity was 20/20 OD and 20/200 OS. In left eye, a superotemporal branch retinal vein occlusion (BRVO) was evident complicated by flame shape retinal hemorrhages and significant centrally involved macular edema. In right eye, very subtle retinal hemorrhages and vessel tortuosity in the superotemporal quadrant could be discerned; though, macula remained spared. In fluorescein angiography, a full blown picture of perfused superotemporal BRVO accompanying with a blockage area due to retinal hemorrhage and leakage into the macula could be detected in the left eye; a small extramacular area of capillary non-perfusion could be seen in the right eye corresponding with a venular obstruction (Fig. 1). Intravitreal injection of bevacizumab was performed in the left eye for treatment of macular edema and close follow-up was planned.

Based on in-patient assessments, high level of ESR (up to 76), C-reactive protein (CRP) (up to 129 mg/L), D-dimer (up to 0.76 μg/mL), Ferritin (up to 430 ng/mL), elevated WBC count (up to 17,700) with lymphopenia (9%) were recorded. Blood pressure, glucose and lipids values were all within normal limits. PTT and PT were slightly prolonged.

This is the first case of BRVO in the context of COVID-19 infection. Coagulation abnormalities and prothrombotic state has been associated with COVID-19 infection [1]. By entry of the viral particles into host's cells, ECA2 and TMPRSS2 get internalized and attenuated. This leads to imbalance of the ACE2/Angiotensin pathway. Vasoconstriction and pronounced inflammation caused by Angiotensin II and endothelial dysfunction caused by ECA2 underexpression leads to a pro-coagulant and pro-adhesive state [1,2]. Further, hyperinflammatory response and the ''cytokine-storm'' lead to a systemic thrombo-inflammatory environment. Systemic thromoboembolic events such as pulmonary thromboembolism and cerebral vascular accidents are well known to occur in COVID-19 patients [1—4]. In our case, increased levels of inflammatory markers, such as CRP, ferritin and D-dimer support this explanation.

In the first descriptions of COVID-19, its ophthalmic manifestations were mostly limited to the redness of eye, irritation, and conjunctivitis. However, it is becoming clear that retina can also be involved in the process of this disease [5]. In this regard, all should be aware of how these patients are at a higher risk of thromboembolic events such as retinal vein occlusion.

## Consent to participate and consent for publication

All the authors agreed on this report. Institutional ethical approval was obtained for this manuscript. Also, consent of the patient is provided through the submission process.

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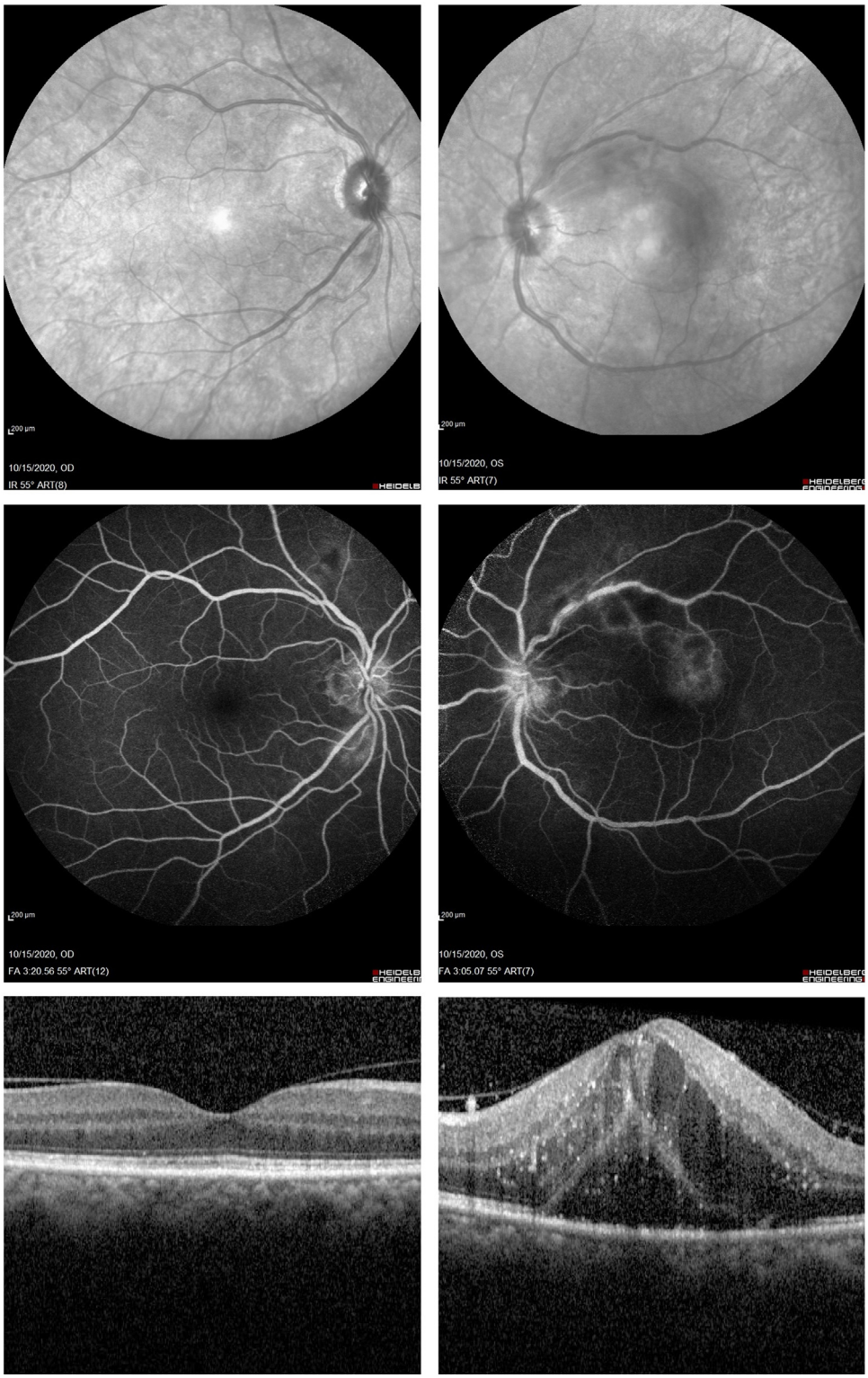


**Figure 1.** Infrared fundus photograph (first row), venous phase (approx. 3 mins) angiography (second row), and structural B-scan OCT (third row) of OD (right column) and OS (left column) of the presented case.

## Authors' contributions

All authors contributed in data collection, medical writing, interpretation of the data, and final review of the draft.

## Acknowledgement

None.

## Disclosure of interest

The authors declare that they have no competing interest.

## Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.jfo.2021.06.003.

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