

COVID-19 and Vascular Pathology: Branch Retinal Vein Occlusion Case Report

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Abstract

Background: Since the COVID-19 pandemic began ophthalmological symptoms such as conjunctivitis, nodular episcleritis and retinal changes have been reported. Hypercoagulability has played a major role in morbidity and mortality in patients with COVID-19.

Case Presentation: A 72-year-old man without any relevant risk factors in his medical history presented cough, high fever (39 - 40°C) and myalgia. NADAL® COVID-19 IgG/IgM test was carried out with a positive result for COVID-19 after 20 days since the onset of symptoms. After 25 days since the beginning of the general and respiratory symptoms, the patient presented a painless gradual loss of vision in the left eye. The posterior segment presented clear signs of inferior macular Branch Retinal Vein Occlusion (BRVO) as well as numerous retinal hemorrhages and cotton wools along the inferior macular branch vein and macular edema.

Conclusion: Our patient suffered a BRVO in his left eye. Therefore, since our patient does not present any other risk factor beyond COVID infection we suggest that SARS-CoV-2 may lead to retinal venous pathology.

Keywords: Branch Retinal Vein Occlusion; COVID-19; Hypercoagulability; SARS-CoV-2; Vascular Pathology

Background

Since the COVID-19 pandemic began a few months ago, more facets of this complex disease have been discovered. This disease is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and is primarily associated with viral pneumonia. Ophthalmological symptoms such as conjunctivitis, nodular episcleritis [1] and retinal changes have also been reported in patients infected with SARS-CoV-2 [2].

Case Presentation

A 72-year-old man without any relevant risk factors in his medical history presented cough, high fever (39 - 40°C) and myalgia

for 3 days. He subsequently presented febricula and started to recover from the myalgia and cough during the next 10 days. Her wife and daughter also presented symptoms as all of them cohabitated. NADAL® COVID-19 IgG/IgM test was carried out to all three with a positive result for COVID-19 after 20 days since the onset of symptoms.

After 25 days since the beginning of the general and respiratory symptoms (onset of general and respiratory symptoms), the patient presented a painless gradual loss of vision in the left eye. He consulted and presented Best Visual Corrected Acuity (BCVA)

of 0.1logMAR for the right eye (OD) and 0.3logMAR for the left eye (OS) with metamorphopsia for OS. Upon ophthalmological examination the anterior segment was clear, however, the posterior segment presented clear signs of inferior macular Branch Retinal Vein Occlusion (BRVO) as well as numerous retinal hemorrhages and cotton wools along the inferior macular branch vein and macular edema. An Optical Coherence Tomography (OCT) was performed in both eyes (Figure 1) and the patient was diagnosed for cystic macular edema secondary to Inferior Macular BRVO in OS. The patient was given Ranibizumab intravitreal injections (Lucentis®, Novartis) in a loading dose; 10 days after he presented improved vision and symptoms of blurriness with a BCVO for the LE of 0.0logMAR. Second blood analysis was carried out with another brand of the test to quantify the antibodies (IgG = 3.41; positive result ≥ 1.4 . 6R86 SARS-CoV-2 IgG® Abbott Laboratories). An OCT was performed again (Figure 2) showing an improvement in macular thickness in the OS and reduction of hyperreflective points spots in the OD.

Figure 1: Left eye (A) optical coherence tomography (OCT) B-scan shows cystic macular edema affecting the lower half of the macular region. Right eye OCT (B) reveals small hyper-reflective lesions (yellow asterisks) placed at the level of the ganglion cell layer (GCL).

Discussion

Branch retinal vein occlusion (BRVO) is a common cause of retinal vascular disease. The pathologic interruption of venous flow in eyes with BRVO usually occurs at an arteriovenous cross-

Figure 2: After 10 days of the first intravitreal injection in the left eye, complete reabsorption of intraretinal edema is evidenced by OCT (A), as well as the persistence of small intraretinal hemorrhages (yellow arrowhead). In the meantime, right eye OCT (B) hyperreflective lesions (yellow asterisks) begin to vanish.

Figure 3: Ultra-widefield fundus photography (Optomap®) was recorded on the 10th day of follow-up after intravitreal injection. In the left eye (A) small intraretinal hemorrhages (yellow arrow) are limited to the lower half of the macular region. The epiretinal membrane is also evidenced (white arrow). Small cotton wool spots (yellow asterisks) (B) along the inferior macular vein are seen in the right eye corresponding to the hyper-reflective lesions located at the GCL showed by the OCT.

ing, where the artery and vein share a common sheath. Systemic vascular diseases such as hypertension and arteriosclerosis are the main risk factors for BRVO. Nevertheless, we can find many other associated diseases like diabetes, hyperlipidemia, hypercoagulable and hyperviscosity states, etc.

Hypercoagulability has played a major role in morbidity and mortality in patients with COVID-19 [3]. There have been multiple documented cases of deep venous thromboses, pulmonary emboli [4] and large-vessel ischemic strokes as a result of COVID-19 [5]. This is suspected to be due to a hyperinflammatory response caused by the SARS-CoV-2 virus [6]. Recently, it has been reported a Central Retinal Artery Occlusion [7] where all these conditions coexisted in the context of a COVID-19 patient. Marinho., *et al.* [2] described subtle changes in OCT, as well as cotton wool spots on funduscopy, suggesting microvascular damage at the retinal vessels.

In this sense, our patient presented these retinal findings in the asymptomatic eye while his left eye suffered a BRVO. Therefore, since our patient does not present any other risk factor beyond COVID infection we suggest that SARS-CoV-2 may lead to retinal venous pathology.

After a comprehensive review of the literature and to the best of our knowledge this is the first case reported of BRVO related to COVID-19. Thus, we present the first case of (isolated) Branch retinal vein occlusion secondary to COVID-19.

Conclusion

Our patient suffered a BRVO in his left eye. Therefore, since our patient does not present any other risk factor beyond COVID infection we suggest that SARS-CoV-2 may lead to retinal venous pathology.

Ethics Approval and Consent to Participate

Not applicable.

Consent for Publication

Not applicable.

Availability of Data and Materials

Not applicable.

Competing Interests

The authors declare that they have no competing interests.

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