

In Reply: Thrombotic Neurovascular Disease in COVID-19 Patients

To the Editor:

We read with interest the Letter entitled “Letter: Thrombotic Neurovascular Disease in COVID-19 Patients”¹; it is a case series on stroke presentation over COVID-19 patients. We are particularly interested in patient 8, the one and only central retinal artery occlusion (CRAO) case due to internal carotid artery (ICA) occlusion, who was also highlighted by the authors. CRAO and ophthalmic artery occlusion (OAO) are both blinding ocular emergencies presenting with acute visual loss, and examinations would find end organ ischemia, ie, whitening of the retina on ophthalmoscopy. Their difference lies barely on the site of occlusion, and they are the ocular equivalent and harbinger of ischemic cerebrovascular stroke.² From our basic understanding of the neuroanatomy and vascular supply, ICA supplies the ophthalmic artery, which then branches out the central retinal artery. Patient 8 described by Sweid et al¹ had ICA occlusion, and the ophthalmic artery should be underperfused. Based on the vascular anatomy, the retina ischemia should be caused by a more proximal obstruction, and OAO should likely be the diagnosis instead of CRAO.

Ocular manifestation of COVID-19 has recently been a hot debate and research topic with evolving case reports published on both arterial (CRAO,³⁻⁵ OAO⁶) and venous (central retinal vein occlusion)⁷⁻⁹ retinal vascular diseases induced by COVID-19 hypercoagulability, thromboembolic pathology, and vasculitis tendency. As ophthalmologists operating a hyperbaric oxygen therapy (HBOT) center to treat acute CRAO,¹⁰ we are interested to know more on the correlation of COVID-19 and CRAO. For background knowledge, HBOT is useful only for CRAO but not OAO, because OAO compromised the posterior ciliary arteries, which supply the eye’s choroidal circulation.¹¹ Without intact choroidal circulation, HBOT could not help reperfusing the ischemic neurosensory retina.^{12,13} Global literature on the incidence and correlation of CRAO with COVID-19 is limited. There were only 3 case reports for COVID-19 related CRAO,³⁻⁵ and 1 case of COVID-19 related OAO,⁶ after a comprehensive search over PubMed, Medline, EMBASE, Cochrane library, and Google Scholar with the terms [“central retinal artery occlusion” OR “CRAO”] and [“COVID” OR “coronavirus”] as on January 16, 2021. Clarification of this special case within the COVID-19 stroke series would help concrete the evidence available between CRAO and COVID-19, and guide ophthalmologists’ treatment plan.

HBOT is indicated for CRAO during the COVID-19 pandemic to salvage vision as supported by the position statement from European Committee for Hyperbaric Medicine.¹⁴ Our tertiary CRAO referral center serving >7 million population has treated 15 acute CRAO cases with HBOT under the


COVID-19 local outbreak, but there were no cases tested positive for SARS-CoV-2 before or after their CRAO episodes, mean follow up period was 5.0 mo. In practice, clarification of the difference between CRAO and OAO is essential for treatment implication as mentioned above.

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