

Letters to the Editor

Central Retinal Artery Occlusion in Patients with COVID-19: Imaging for Underlying Causes

From

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Editor:

We read with interest the research article published online in *Radiology* on February 16, 2021, by Dr Lecler and colleagues (1) that discussed hyperintense nodules in the macular region at fluid-attenuated inversion recovery–weighted imaging in patients with COVID-19. We are particularly interested in the central retinal artery occlusion (CRAO) case, which was highlighted by the authors but lacked details regarding whether there was unilateral or bilateral ocular involvement. COVID-19 systemic infection is prone to endothelial insult with vasculitis tendency, in which bilateral CRAO would not be unusual. The section on correlations between MRI and ophthalmologic findings listed features separately without identifiable correlation. We are interested in whether the CRAO case was the same patient having multiple infarcts in the anterior cerebral artery territory, or the one with frontal hematoma, or others.

Ocular manifestation of COVID-19 is a hot topic given that the eye is optically clear to allow for direct inspection of the microvascular structures without biopsy. Regarding retinal vascular diseases, only a handful of cases were published on CRAO in patients with COVID-19 (2–6), identified by searches over PubMed, Medline, EMBASE, Scopus, Web of Science, Cochrane library, and Google Scholar with the terms [“central retinal artery occlusion” OR “CRAO”] AND [“COVID” OR “coronavirus”] on February 16th, 2021. Cases reported by Acharya et al (2), Montesel et al (3), and Turedi et al (5) had unremarkable neuroradiologic findings, whereas Murchison et al (4) and Sweid et al (6) mentioned the neuroimaging findings of unilateral internal carotid artery obstruction causing secondary CRAO. The unique case of CRAO at MRI in patients with COVID-19 in the work by Dr Lecler and colleagues was the sixth in the literature, and the third such report with positive radiologic findings.

Stroke is associated with COVID-19 because of its hypercoagulability and thromboembolic tendency, yet the evidence is uncertain in CRAO, limited by small number

of reported cases. CRAO is a blinding ocular emergency and patients present with acute visual loss. Resultant retinal ischemia causes neurosensory retinal edema, thus retinal whitening at ophthalmoscopy. At diffusion-weighted MRI in patients with CRAO, there are some reports of retinal hypersignal diffusion of the papilla or scattered diffusion restriction over the retina. As Dr Lecler and colleagues mentioned, there were no patients with optic nerve abnormalities. We would be interested in whether the patient with CRAO underwent concomitant cerebrovascular stroke or vasculitis features at neuroimaging.

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Response

From

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We thank Drs Au and Ko for their valuable remarks. Indeed, there are very few observations of CRAO in patients with COVID-19. The patient we described in our study (1) had a unilateral CRAO involving the right eye. He had a small infarct located in the right middle cerebral artery

territory and a dissection of the right internal carotid artery with severe stenosis. The dissection was considered secondary to efforts from severe coughing.

At MRI, there were no ocular or orbital abnormalities related to the CRAO, such as diffusion restriction of the papilla or the retina at diffusion-weighted imaging, or inflammatory changes of the right ophthalmic artery at postcontrast T1-weighted imaging, as reported in a case of CRAO secondary to lupus (2).

Even if one remains cautious regarding the precise mechanism of the CRAO, the ophthalmologic team considered it more likely that the CRAO was because of the ipsilateral carotid artery dissection rather than the COVID-19 infection, like cases of CRAO caused by unilateral internal carotid artery obstruction mentioned by Murchison et al (3) and Sweid et al (4). However, COVID-19 is associated with hypercoagulability and thromboembolic pathologic structure (5). Therefore, it might have contributed to the formation of multiple emboli leading to distal cerebral and ophthalmic infarcts.

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