

Commentary: COVID-19 disease is more than just a respiratory infection

The coronavirus disease (COVID-19), caused by the novel, highly contagious severe acute respiratory syndrome coronavirus 2, has quickly become a global health emergency. It started with an outbreak of pneumonia causing fever, cough, and shortness of breath. However, the virus has been noted to involve multiple organs and systems. The global research community has made an impressive effort in compiling the various manifestations of the disease in a short time.^[1]

The infected individuals are predisposed to arterial and venous thromboembolic complications like deep vein thrombosis, pulmonary embolism, myocardial infarction, and stroke. The proposed mechanisms responsible for these thromboembolic events include a transient hypercoagulable state due to systemic inflammation and cytokine storm, postinfectious immune-mediated responses, and direct viral-induced endothelitis.^[2] The incidence of thrombotic complications in COVID-19 patients admitted to intensive care unit ranges between 16 to 49%.^[1] Acute cardiovascular accident has been reported in 0.5–6.0% of COVID-19 patients.^[3] Acharya *et al.*^[4] first reported a central retinal artery occlusion (CRAO) in

a case of severe COVID-19 disease. However, recent evidence suggests that arterial thromboembolism can occur in patients with mild disease also. Currently, the incidence is unknown due to possible underreporting of symptoms. Turedi *et al.* first reported CRAO within a case of moderate COVID-19 disease.^[5] Early anticoagulant treatment has been reported to improve the clinical outcome of COVID-19 patients and reduce the risk of thromboembolic events.^[1] Interestingly, all the patients that have been reported to develop RAO secondary to COVID-19 were already being treated with anticoagulant therapy. The occurrence of RAO in COVID-19 patients is limited to only case reports. Further studies should be planned to evaluate out the incidence of vascular occlusions in patients suffering and recovered from COVID-19. Such studies can give us insight related to the association of the ocular diseases with the stage and severity of the COVID-19 infection.

Our knowledge regarding the pathophysiology and treatment of this disease is still in its preliminary stage. The fast-paced ongoing research will hopefully provide better algorithms for management of this disease and prevention of its complications. Physicians treating COVID-19 patients must be sensitized to seek an urgent retina consultation for patients complaining of symptoms like blurry vision, sudden painless visual loss, or scotomas.

We congratulate the authors for reporting the first case of an isolated cilioretinal artery occlusion (CLRAO) associated with paracentral acute middle maculopathy (PAMM) in a patient with moderate COVID-19 disease and no other predisposing diseases. PAMM is reported to be present in 100% of isolated CLRAO due to hypoperfusion of the involved cilioretinal artery.^[6]

The authors started treating the patient 48 h after the episode and gave 20 sessions (40 h) of hyperbaric oxygen (HBO), which led to resolution of retinal edema after 3 weeks. HBO involves the inhalation of 100% oxygen at pressures greater than 1 atm. The inspired oxygen partial pressure is nearly 203 kPa, which is almost 10 times that of breathing air at normal atmospheric pressure. It is postulated that oxygen at higher pressures diffuses from the choroidal circulation to reach the ischaemic retina and increase the oxygen delivery to the ischemic tissue until spontaneous or assisted reperfusion occurs.^[7] However, isolated CLRAO is associated with good prognosis and does not usually require treatment. Retinal edema usually resolves spontaneously within few weeks. The central field defect improves in nearly half of the eyes and remains stable in the other half.^[8] HBO is usually reserved for patients presenting with poor vision due to CRAO and BRAO. Also, the maximum benefit of the treatment is expected in case it is started within 6–8 h of the occlusion.^[7] The risk-benefit for the application of multiple sessions to gain <1 line of vision during the COVID-19 pandemic should be carefully calculated.

Role of corticosteroids in COVID-19 has been evaluated by several studies. The RECOVERY trial was a prospective study where 2104 patients were randomized to dexamethasone 6 mg per day (oral or intravenous) for 10 days and compared to the 4321 patients receiving usual care. They concluded that in patients hospitalized with COVID-19, dexamethasone reduced the 28-day mortality among those receiving invasive mechanical ventilation or oxygen at randomization, but not among patients with mild to moderate COVID-19 disease.^[9]

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