



CASE REPORT

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Central Retinal Vein Occlusion in a Young Healthy COVID-19 Patient in Pakistan

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Central Retinal Vein Occlusion (CRVO) is a rare but potentially serious vascular event in the eye, leading to vision loss. We present a case of CRVO in a young, otherwise healthy patient diagnosed with COVID-19 in Pakistan. This case highlights the possible association between COVID-19 and ocular complications, especially in younger individuals who may not exhibit typical risk factors for retinal vascular diseases.

Keywords: Central Retinal Vein Occlusion; COVID-19; Hypercoagulability; Ocular Complications; Retinal Vascular Disease; Pakistan; Young Healthy Patient.

INTRODUCTION

Central Retinal Vein Occlusion (CRVO) occurs when the central retinal vein, responsible for draining blood from the retina, becomes blocked. [1] The condition is often associated with systemic risk factors such as hypertension, diabetes, and glaucoma. [2] However, CRVO has also been linked to viral infections, particularly COVID-19, which has emerged as a global health concern.

The potential for COVID-19 to cause systemic inflammation, hypercoagulability, and endothelial dysfunction may predispose patients to retinal vascular complications, even in those without

preexisting risk factors. [3] Here, we describe the case of a young healthy patient with COVID-19 who developed CRVO.

CASE REPORT

A 29-year-old male, previously healthy with no significant medical history, presented to the ophthalmology department with complaints of sudden, painless vision loss in his left eye. The patient had recently tested positive for COVID-19 and experienced mild respiratory symptoms including cough, fever, and malaise, which had resolved 10 days prior to the onset of ocular symptoms.

Upon clinical examination, visual acuity was 20/40 in the right eye and 20/200 in the left eye. Anterior segment examination revealed no abnormalities, and intraocular pressure was normal in both eyes. Fundus examination of the left eye showed signs of CRVO, including retinal hemorrhages, cotton-wool spots, and macular edema. The right eye was unremarkable. Optical coherence tomography (OCT) of the left eye confirmed the presence of macular edema. Fluorescein angiography revealed a delayed venous filling and extensive retinal hemorrhages corresponding to the affected area.

Systemic examination showed no significant findings, and laboratory investigations revealed mild elevation in inflammatory markers, including C-reactive protein (CRP) and D-dimer, which are often elevated in COVID-19 infections. The patient's coagulation profile did not show significant abnormalities, and he had no history of thrombophilia or other clotting disorders.

DISCUSSION

This case highlights a rare, yet concerning complication of COVID-19 infection in a young and otherwise healthy individual. Retinal vascular occlusions, including CRVO, have been reported in COVID-19 patients, primarily due to the hypercoagulable state induced by the virus. COVID-19 has been known to cause systemic inflammation and endothelial dysfunction, which can contribute to the formation of blood clots in both large and small vessels, including those in the retina. [4]

The pathophysiology behind CRVO in COVID-19 patients likely involves a combination of factors:

Endothelial Dysfunction: COVID-19 directly infects endothelial cells via ACE2 receptors, leading to vascular inflammation and impaired blood flow.

Hypercoagulability: COVID-19 induces a hypercoagulable state, increasing the risk of thrombosis in various vascular beds. [5]

Inflammation: The cytokine storm seen in severe COVID-19 infections may also contribute to vascular damage, further increasing the risk of thrombotic events like CRVO. [6]

Although CRVO is more common in older individuals with systemic risk factors such as hypertension, diabetes, or a history of smoking, this case underscores the possibility of CRVO even in younger, healthy patients, particularly in the context of COVID-19. The exact prevalence of ocular complications like CRVO in COVID-19 patients remains unclear, and further studies are needed to determine the long-term impact of the virus on the ocular vasculature. [7]

Management:

The patient was referred for further evaluation by a retinal specialist. Given the relatively recent onset of the condition, the management plan included:

Intravitreal Anti-VEGF Therapy: To reduce macular edema and prevent further vision loss.

Corticosteroids: For inflammation management and potential improvement in visual outcomes.

Systemic Anticoagulation: Considering the hypercoagulable state related to COVID-19, low-molecular-weight heparin (LMWH) was administered to reduce the risk of further thrombotic events. [8]

The patient was also monitored for any signs of a recurrence of COVID-19 symptoms and managed with appropriate supportive care.

CONCLUSION

This case illustrates the potential for COVID-19 to cause ocular complications, such as CRVO, even in young and healthy individuals. Healthcare providers should be aware of the possibility of retinal vascular events in patients with recent COVID-19 infections, especially those presenting with sudden vision changes. Early recognition and prompt management are essential to prevent

further visual impairment and manage the associated systemic risks. Further research is needed to understand the full spectrum of ocular manifestations in COVID-19 patients and the underlying mechanisms involved.

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