Case Report

A Cilioretinal Artery Occlusion (CLRAO) Associated with Optic Disc Edema after Viral Vector SARS-CoV-2 Vaccination: Case Report

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A cilioretinal artery occlusion (CLRAO) associated with optic disc edema was diagnosed in a patient seven days after the second dose of viral vector SARS-CoV-2 vaccination. The patient developed sudden blurred vision in the inferior hemifield of the right eye. His fundus examination showed retina edema at the superotemporal quadrant within vascular arcades of the right eye. Fundus fluorescein angiography (FFA), optical coherence tomography (OCT), and optical coherent tomography angiography (OCTA) were used to confirm the diagnosis.

Keywords: COVID-19; SARS-Cov2; Cilioretinal artery occlusion; Disc edema; Vaccine

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Vaccines to prevent SARS-CoV-2 infection are considered the most promising approach for curbing the pandemic COVID-19. It has been reported that more than 360 million people have received three anti-COVID-19 vaccinations (Comirnaty® from Pfizer-BioNTech, Moderna COVID-19 vaccine, and AZD1222 from Oxford-AstraZeneca), and in some cases have showed that venous (VTE) and arterial (ART) thrombotic events including central venous thrombosis might have occurred in association with an anti-SARS-CoV-2 vaccine[1]. Endo et al[2] reported a case of central retinal vein occlusion after a mRNA SARS-CoV-2 vaccination. Cilioretinal artery (CLRA), which originates from the short posterior ciliary artery, is the most common variant of the retinal circulation that occurs in 20% to 32% of normal eyes[3]. Cilioretinal artery occlusion (CLRAO) is a rare retinal event, with an incidence of 5.3% to 7.1% of all retina artery occlusions[4]. The mechanism of non-arteritic CLRAO associated with disc edema is driven by the optic disc edema compressing the central retinal venous pressure and decreasing CLRA pressure[5]. Herein, the present case report documented a patient with a CLRAO associated with optic disc edema post-AZD112 vaccination.

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Case Report

A 41-year-old Thai male presented with subacute blurred vision in the right eye. He had received his second dose of viral vector SARS-CoV-2 vaccine as AZD1222 from Oxford-AstraZeneca, seven days ago without any immediate complications. However, a month after his first dose vaccination, he had a progressive headache and blurred vision in the right eye. His headache spontaneously resolved within two weeks, but his blurred vision did not improve. He denied having any systemic symptoms. The first visit of the present patient was seven days after his second dose of a viral vector SARS-CoV-2 vaccine of AZD1222 from Oxford-AstraZeneca.

He had a body mass index of 25 kg/m² and blood pressure measured as 142/93 mmHg. He did not have any significant medical history, was not on any medication, and denied smoking. His best-corrected visual acuity (BCVA) was 20/30 in the right eye and 20/20 in the left eye. His pupils were equal, round, and reactive to light without relative afferent pupillary defect (RAPD). Fundus examination

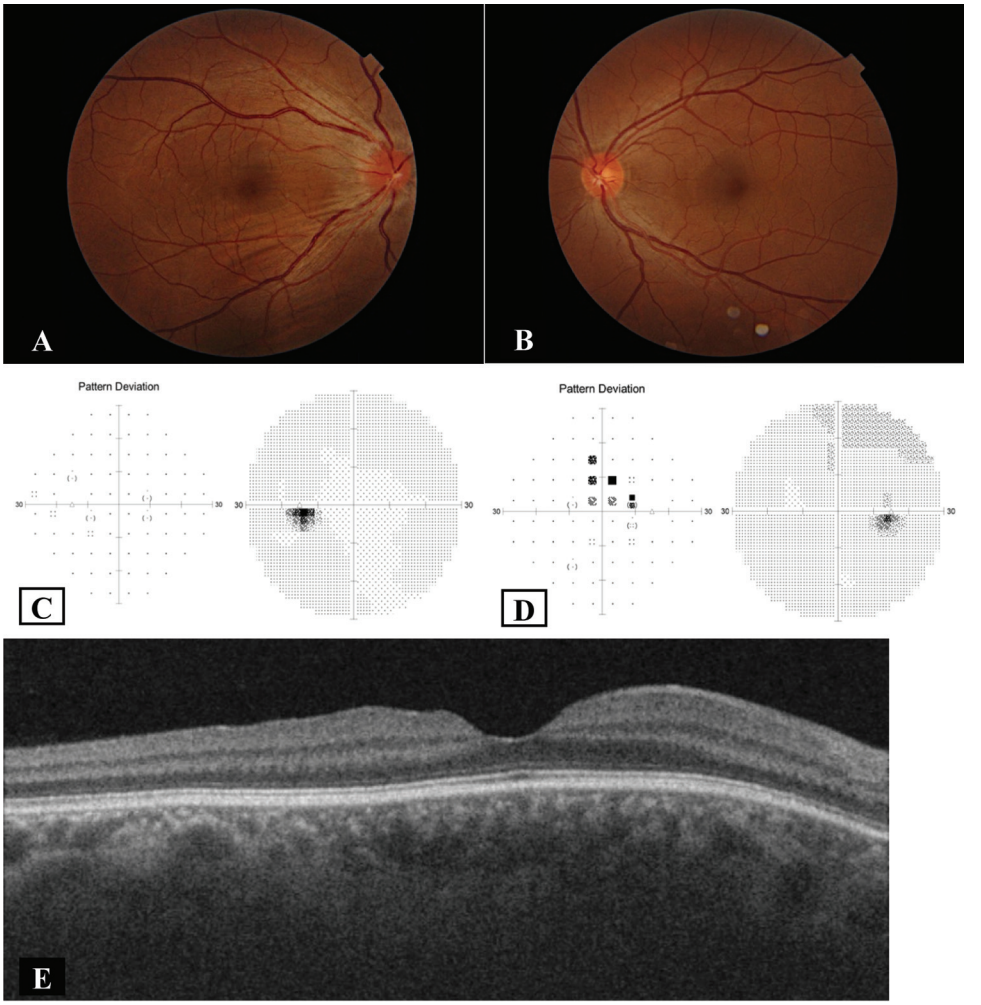

Figure 1. Color fundus photo photography showed temporal optic disc edema, no exudate at the macula, no vasculitis or retinitis in the right eye (A), and normal in the left eye (B). CTVF 30-2 showed normal in the left eye (C) and paracentral scotoma in the right eye (D). Macular OCT showed hyper-reflectivity and thickening of inner retina correlating with disc swelling in the right eye (E).

showed temporal optic disc edema, no exudate at the macula, no vasculitis or retinitis in the right eye (Figure 1). His extraocular movement was full in both eyes. His color vision was normal by Ishihara test. His visual field was assessed by computerized visual field (CTVF) 30-2 showed a paracentral scotoma in the right eye (Figure 1). The other neurological and general examination were normal. The macular optical coherence tomography (OCT) demonstrated hyper-reflectivity and thickening of inner retina correlating with disc swelling, without subretinal fluid in the right eye (Figure 1). The provisional diagnosis of optic neuritis in the right eye was considered. Magnetic resonance imaging (MRI) of the brain and orbit revealed brain parenchyma and bilateral optic nerves were normal. There was no space occupying lesion. Both intra and extraconal space was normal in appearance. His complete blood count showed normal. Serum including, erythrocyte sedimentation rate (ESR), C reactive protein (CRP), anti-HIV antibody, rapid plasma reagin (RPR), and anti-Treponema Pallidum tests (anti-TP) were negative. The chest X-ray was unremarkable.

After four days of eye examinations, he developed acute blurred vision in the right eye, especially in the inferior hemifield. His BCVA was 20/200 and 20/20 in the right and left eyes, respectively. There was no RAPD. The fundus examination showed decreased optic disc edema, retina edema at the superotemporal quadrant within vascular arcades, no boxing vessels, no exudate at the macula, and no vasculitis or retinitis in the right eye (Figure 2). All other eye examinations,

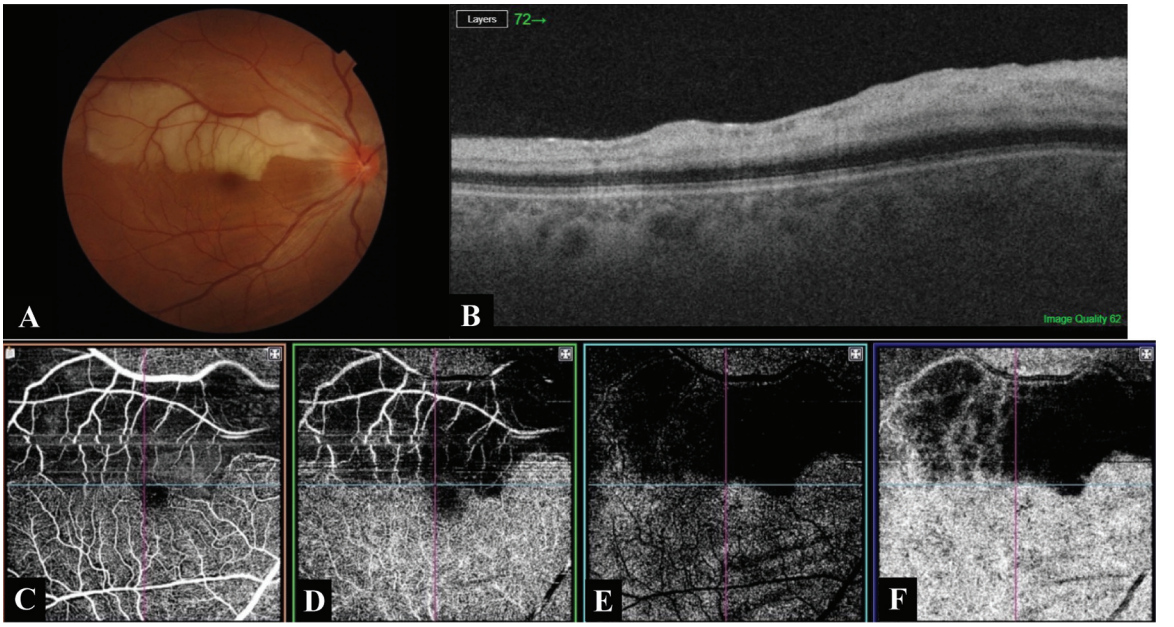

Figure 2. Color fundus photography showed retinal whitening along with the CLRA in the right eye (A), macular OCT showed hyper-reflectivity and thickening of the inner retina (B), OCTA image of the superficial layer (C), deep layer (D), outer retina layer (E), and choriocapillaris layer (F). with decreased vascular flow in all layers.

neurological signs, and general systemic signs were normal.

The fundus fluorescein angiography (FFA) showed delay arteriovenous phase, venous leakage, and disc leakage at the superior quadrant in the right eye. The macular OCT showed hyper-reflectivity and thickening of the inner retina in the right eye (Figure 2). The optical coherent tomography angiography (OCTA) showed the superficial and deep capillary plexus had decreased vascular density in superior areas closer to the CLRA in the right eye (Figure 2). Renal function tests, hemoglobin A1C, and lipid profile were within normal limits. Serum including anti-nuclear antibody (ANA) and anti-neutrophil cytoplasmic antibody (ANCA) were negative. A hypercoagulable state due to antiphospholipid was ruled out. In addition, lupus anticoagulant was negative.

In the present patient, there was an absence of systemic symptoms suggestive of specific syndrome for vasculitis and risk factors for CLRAO. The right eye was diagnosed with a non-arteritic CLRAO associated with disc edema. At three-month follow-up visit, his BCVA in the right eye improved to 20/100. There was no RAPD.

Discussion

CLRAO is a serious and emergency ophthalmic condition. Diagnosis of this condition requires a high degree of suspicion and complete investigation. The common risk factors for non-arteritic CLRAO include antiphospholipid syndrome, drugs such as cisplatin and sildenafil, embolism, migraine, systemic lupus erythematosus (SLE), pregnancy, systemic hypertension, and hyperhomocysteinemia[6-9]. Due to no previous history of risk factors for arterial occlusion. The present case may indicate an AZD1222 induced non-arteritic CLRAO associated with disc edema.

To the authors' knowledge, there is no reported case of non-arteritic CLRAO associated with disc edema related to COVID-19 vaccine[10].

The previous study had suggested the patient's visual symptoms relate to the central, systemic illness triggered by the vaccine. Reduction of central acuity can result from hypoperfusion of the retina, optic nerve, or any part of the visual pathways[11]. In the present patient, the author presumes CLRAO may develop when disc edema compresses the central retina venous pressure, and possibly CLRA pressure leads to retinal infarction.

Conclusion

The present case represented a non-arteritic CLRAO associated with disc edema following second administration of a COVID-19 viral vector vaccine

with AZD1222 from Oxford-AstraZeneca.

What is already known on this topic?

To the authors' knowledge, there is no reported case of non-arteritic CLRAO associated with disc edema related to the viral vector SARS-CoV-2 vaccine.

What this study adds?

The authors describe a case diagnosed with CLRAO associated with optic disc edema seven days after the second dose of viral vector SARS-CoV-2 vaccination.

Ethical approval

The study was approved by the Ethics Committee of Burapha University (REC number: HS088/2564).

Conflicts of interest

The authors declare no conflict of interest.

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