

Comments on: After the Storm: Ophthalmic Manifestations of COVID-19 Vaccines

Dear Editor,

We read with interest the review by Sen *et al.*^[1] titled "After the Storm: Ophthalmic Manifestations of COVID-19 Vaccines." It was a comprehensive review of anterior and posterior segment manifestations as well as eyelid, orbital, and neuro-ophthalmological manifestations. We are particularly interested in the topic "Retinal vascular occlusions" under the subheading "Posterior Segment Manifestations of COVID-19 Vaccine," where only retinal vein occlusion (RVO) was discussed, but no data on retinal artery occlusion (RAO) was available.

Although there were no cases of COVID-19-vaccine-related RAO published in Sen *et al.*'s^[1] search period from January 1 to November 7, 2021, a few case reports and case series were published in the following half year.^[2-6] Here, we would like to supplement Sen *et al.*'s^[1] review on RAO after COVID-19 vaccine for completeness [Table 1]. Literature review by Su *et al.*^[2] summarized COVID-19-vaccine-related RAO up to January 10, 2022. Two publications by Ikegami *et al.*^[7] and Girbardt *et al.*^[8] were included, both of which were reporting on mRNA SARS-CoV-2-vaccine-related retinal vascular occlusion events. Interestingly, both of these primary studies had a case of combined central RAO and RVO. Another case was published by Lee *et al.*^[3] that was also associated with mRNA SARS-CoV-2 vaccine. More cases of branch RAO were subsequently published by Ishibashi *et al.*^[5] and Kang *et al.*^[6] who also reported its association with mRNA SARS-CoV-2 vaccine.

Table 1: Summary of retinal artery occlusion cases following COVID-19 vaccinations

Authors	Patient Age/Gender	Comorbidities	Vaccine received	Diagnosis	Symptoms onset
Ikegami <i>et al.</i> (2021) ^[7]	54/F	Hypothyroidism	2 doses of mRNA-1273 Moderna (mRNA SARS-CoV-2)	Right eye combined CRAO and CRVO	2 days after 2 nd dose
Girbardt <i>et al.</i> (2021) ^[8]	38/M	Ankylosing spondylitis	2 doses of Comirnaty BNT162b2 Pfizer-BioNTech (mRNA SARS-CoV-2)	Right eye BRAO	3 days after 2 nd dose
Girbardt <i>et al.</i> (2021) ^[8]	81/F	Arterial hypertension	2 doses of Comirnaty BNT162b2 Pfizer-BioNTech (mRNA SARS-CoV-2)	Right eye combined CRAO and CRVO	12 days after 2 nd dose
Lee <i>et al.</i> (2022) ^[3]	34/M	Hyperlipidemia (newly diagnosed)	2 doses of Comirnaty BNT162b2 Pfizer-BioNTech (mRNA SARS-CoV-2)	Left eye combined CRAO and CRVO	10-12 days after 2 nd dose
Abdin <i>et al.</i> (2022) ^[4]	76/F	Hypothyroidism	1 dose of AstraZeneca (adenoviral vector-based SARS-CoV-2)	Left eye CRAO	2 days
Ishibashi <i>et al.</i> (2022) ^[5]	38/F	Nil	1 dose of Comirnaty BNT162b2 Pfizer-BioNTech (mRNA SARS-CoV-2)	Right eye BRAO	15 days
Ishibashi <i>et al.</i> (2022) ^[5]	80/M	Diabetes mellitus, hypertension	2 doses of Comirnaty BNT162b2 Pfizer-BioNTech (mRNA SARS-CoV-2)	Right eye BRAO	42 days after 2 nd dose
Ishibashi <i>et al.</i> (2022) ^[5]	86/M	Hypertension	2 doses of Comirnaty BNT162b2 Pfizer-BioNTech (mRNA SARS-CoV-2)	Left eye BRAO	4 days after 2 nd dose
Ishibashi <i>et al.</i> (2022) ^[5]	57/F	Nil	2 doses of Comirnaty BNT162b2 Pfizer-BioNTech (mRNA SARS-CoV-2)	Right eye BRAO	61 days after 2 nd dose
Kang <i>et al.</i> (2022) ^[6]	64/M	Type 2 diabetes, hypertension	1 dose of Comirnaty BNT162b2 Pfizer-BioNTech (mRNA SARS-CoV-2)	Right eye BRAO	3 days

M, Male; F, Female; CRAO, Central retinal artery occlusion; CRVO, Central retinal vein occlusion; BRAO, Branch retinal artery occlusion; BRVO, Branch retinal vein occlusion; SARS-CoV-2, Severe acute respiratory syndrome coronavirus 2

Although literature search yielded more cases of RAO after mRNA SARS-CoV-2 vaccine, the actual incidence of such was uncertain given the popularity of the mRNA vaccine all over the world. Proposed mechanisms for RAO post-COVID-19 vaccination include antigen-specific cell, molecular mimicry, and antibody-mediated hypersensitivity reactions. Up to mid-June 2022, there still have been no prospective studies showing the difference between RAO incidence across mRNA SARS-CoV-2 vaccine versus the viral vector vaccine.

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Conflicts of interest

There are no conflicts of interest.

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