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Central retinal vein occlusion following mRNA severe acute respiratory syndrome coronavirus 2 vaccination

Kumiko Noguchi, Ryota Takahashi, Shinji Makino

CASE REPORT

A 46-year-old healthy woman presented with a 6-day history of visual disturbance in the right eye after she received the second dose of the BNT162b2 (Pfizer-BioNTech) COVID-19 vaccine. Examination revealed best-corrected visual acuity of 12/20 in the right eye. Fundoscopy revealed venous dilatation and tortuosity with dispersed dot and flame-shaped hemorrhages (Figure 1), and the patient was diagnosed with impending central retinal vein occlusion (CRVO). She was treated using an intravitreal injection of ranibizumab and showed a favorable response. During three months of follow-up, visual acuity improved to 20/20 (Figure 2).

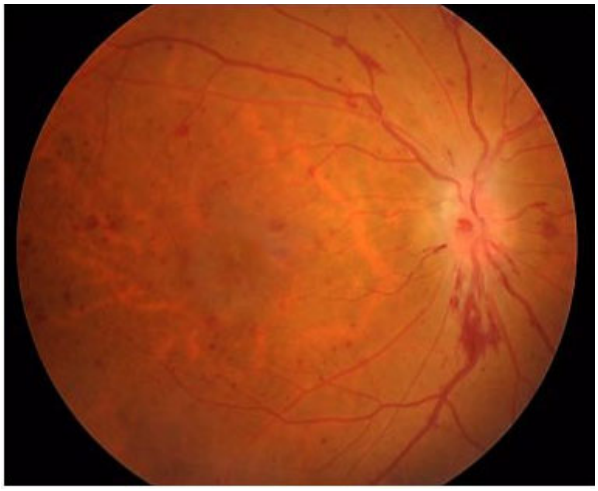

Figure 1: Fundus photograph of the right eye showing venous dilatation and tortuosity with dispersed dot and flame-shaped hemorrhages.

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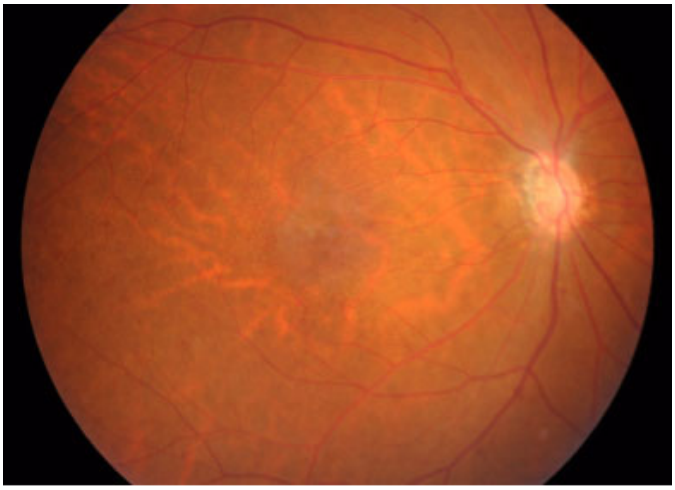

Figure 2: Fundus photograph after the treatment showing improvement of CRVO.

DISCUSSION

Few reports in the literature describe CRVO following COVID-19 vaccination [1–3]. Endo et al. [1] reported CRVO 15 days after the first dose of the BNT162b2 vaccine in a 52-year-old healthy man. Shah et al. [2] reported CRVO a few days after the first dose of the BNT162b2 vaccine in a 27-year-old healthy woman. Sonawane et al. [3] reported CRVO four days after the second dose of the ChAdOX1 nCoV-19 (Oxford University/ AstraZeneca) vaccine in a 50-year-old man with diabetes. To our knowledge, this present case is the first report of CRVO, which was temporally associated with COVID-19 vaccination in Japan.

COVID-19 vaccines trigger the production of high levels of neutralizing antibodies, which recognize and target the spike proteins of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and destroy it before dissemination of the virus and the onset of illness [4]. Neutralizing antibodies that develop against the spike proteins and/or activated T-helper-1 cells after vaccination can cross-react with proteins and antigens in large arteries, the outer retinal layers, and retinal pigment epithelial cells [4, 5].

CONCLUSION

Whether CRVO observed after SARS-CoV-2 vaccination was consequential or coincidental in the present case remains unclear; however, we speculate that the close temporal association with COVID-19 vaccination suggests the possibility of vasculopathy against a background of inflammatory or post-vaccine thrombotic reactions to the timing of onset of CRVO.

Keywords: Central retinal vein occlusion, Coronavirus disease 2019 (COVID-19) vaccination, Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)

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Author Contributions

Kumiko Noguchi – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Ryota Takahashi – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Shinji Makino – Conception of the work, Design of the work, Analysis of data, Interpretation of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Guarantor of Submission

The corresponding author is the guarantor of submission.

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Consent Statement

Written informed consent was obtained from the patient for publication of this article.

Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.