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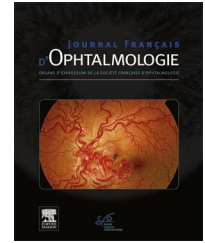


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## LETTER TO THE EDITOR

### Bilateral retinal vein occlusion after two doses of SARS-CoV-2 adenovirus vector-based vaccine



*Occlusion veineuse rétinienne bilatérale après deux doses de vaccin à base de vecteur adénovirus SARS-CoV-2*

#### Introduction

Central retinal vein occlusion (CRVO) and other systemic thromboembolic events after SARS-CoV-2 infection have been extensively documented. With large vaccine drives all across the world, there are a few cases reports on post-vaccine thrombotic events associated with systemic inflammation, platelet and endothelial dysfunction. These reports include both adenovirus vector-based and mRNA types vaccines [1,2]. Therefore, the aim of this report is to present the case of a bilateral vein occlusion developed after two-dose SARS-CoV-2 Covishield®, AZD1222 (ChAdOx1-S) vaccination.

#### Case description

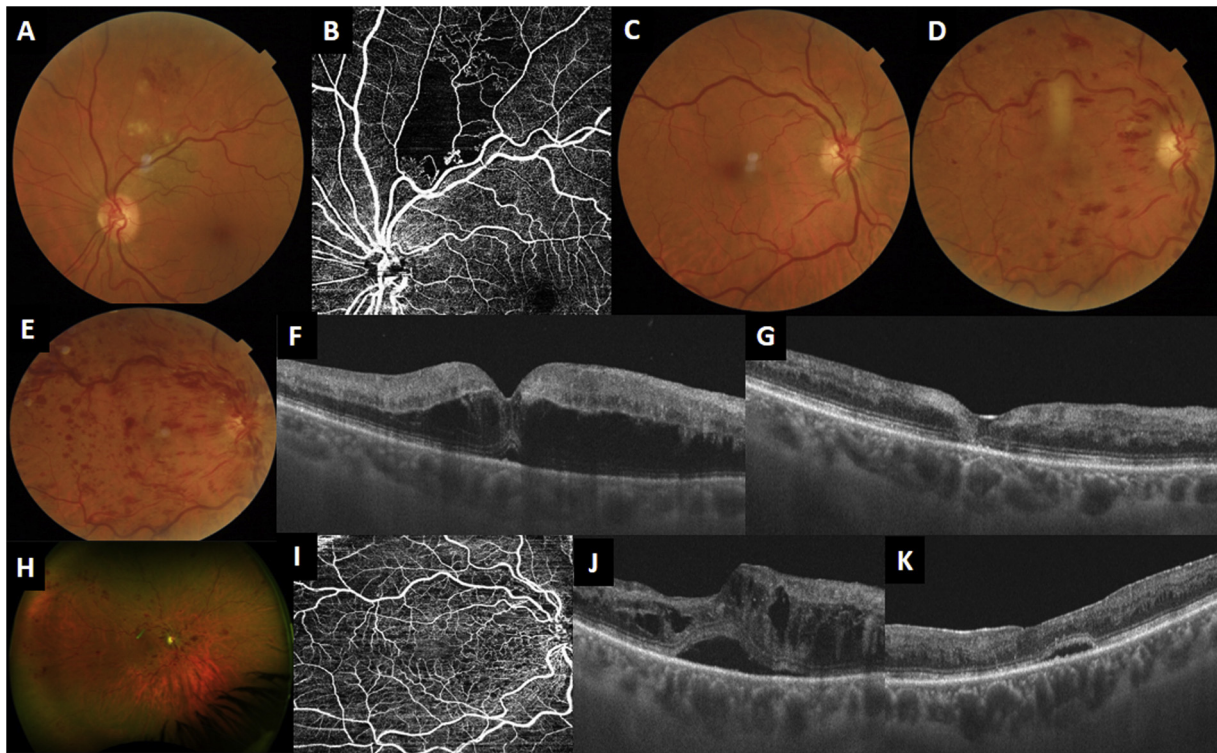
We present the case of a 69-year-old healthy non-smoking female with a superotemporal branch retinal vein occlusion (BRVO) in her left eye (LE) (Fig. 1A.) Past medical history was unremarkable: no cardiovascular risk factors, diabetes mellitus or impaired fasting glucose, blood hypertension or glaucoma. The patient had received the first dose of the SARS-CoV-2 vaccine with Covishield, AZD1222 (ChAdOx1-S, AstraZeneca®) vaccine 10 days before. At presentation, she was asymptomatic, best-corrected visual acuity (BCVA) was 20/20 in both eyes and the findings were detected during a routine ophthalmological visit for a choroidal macular nevus in that eye. The optical coherence tomography (OCT) revealed no edema in the macular region, while the OCT-angiography (OCTA) showed non-perfusion areas adjacent to the vein occlusion (Fig. 1B) and far from the macula. The right eye (RE) showed no alterations (Fig. 1C).

At the 6-week follow-up, the patient continued asymptomatic. The fundus signs of BRVO in the LE had involuted until complete resolution, but the fellow eye examination showed a CRVO (Fig. 1D). At this time, the patient had received the second dose of the same vaccine 15 days before. BCVA remained 20/20 in both eyes and there was

no macular edema by OCT, so observation protocol with a one-month follow-up appointment was decided. The patient returned 15 days later referring sudden-onset visual acuity loss and central scotoma in her RE. On examination, BCVA was 20/100 in the RE, a larger number of haemorrhages were observed (Fig. 1E) and the OCT revealed a cystoid macular edema with retinal neurosensory detachment and hyperreflectivity of outer retinal layers (Fig. 1F). Treatment with dexamethasone intravitreal implant was decided, successfully achieving a complete resolution of the macular edema at two months (Fig. 1G and H), although BCVA was 20/150 due to macular atrophy evidenced by OCT. Wide-field (12 × 12 mm) OCTA was performed in the RE, revealing no signs of retinal neovascularization and no remarkable non-perfused areas (Fig. 1I). There was a recurrence of the macular edema at 4 months after treatment (Fig. 1J). Therefore, a new dexamethasone intravitreal implant was administered. BVCA was 20/200 1 month after the second implant, with a great improvement in the macular intraretinal edema (Fig. 1K). Internal Medicine examination and a general work-up were performed after the two doses of the vaccine and no other possible cause was identified.

#### Discussion

Several cases of retinal vascular disease development after SARS-CoV-2 vaccination have been reported, most of them being CRVO. Bialasiewicz *et al.* reported a 50-year-old healthy patient who developed a CRVO after the second dose of mRNA (BioNTech/Pfizer®) [3]. Sonawane *et al.* described a further two cases 4 days and 3 days respectively after second dose of AZD1222 (Covishield/AstraZeneca®) [4]. Sacconi *et al.* reported a 74-year-old female, 48 hours after the second dose of mRNA-1237 (Moderna®) [5]. Tanaka *et al.* showed two cases of exacerbation of a previous CRVO episode, one was a 71-year-old female and the other one was a 74-year-old man, after receiving the second and first dose of BioNTech/Pfizer®, respectively [6]. Ikegami *et al.* reported a combined CRVO and central retinal artery occlusion case in a 54-year-old female 2 days after a second dose of Moderna® [7]. Finally, Park *et al.* reported a retrospective case series of RVO after SARS-CoV-2 vaccination [8]. Sen and Honavar have described that the possible mechanisms include molecular mimicry of the vaccine components with host ocular tissues, antigen-specific cell and antibody-mediated hypersensitivity reactions to viral antigens and adjuvants present in the vaccines [2].



**Figure 1.** A) Branch retinal vein occlusion in the left eye. B) The OCTA showed non-perfusion areas. C) The right eye (RE) showed no alterations. D) At the 6-week follow-up, the RE showed a CRVO. E) In the RE, a larger number of haemorrhages were observed and F) the OCT revealed a cystoid macular edema. G and H) Complete resolution of the edema at two months after treatment with dexamethasone implant. I) Wide-field OCTA revealed no signs of remarkable non-perfused areas. J) Recurrence of the edema at 4 months after treatment, K) with a great improvement one month after the second implant showed.

## Conclusion

In conclusion, we report the first case with bilateral retinal vein occlusion after SARS-CoV-2 vaccination. However, the relationship between these two events remains unclear and further research should be performed to better understand the potential link between retinal thrombotic events and vaccination. It is worth drawing attention to the fact that these adverse events related to COVID-19 vaccines have a remarkably low incidence considering the huge number of people that have been vaccinated around the world [1].

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## Disclosure of interest

The authors declare that they have no competing interest.

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