

## Bilateral Panuveitis Combined with Optic Neuritis in A Young Individual Related to Covid-19 Vaccination: Literature Review and Case Report

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Panuveitis; Optic neuritis; COVID-19 vaccine; mRNA vaccine

## 1. Abstract

This research aimed to conduct a literature review on COVID-19-vaccine-related uveitis and optic neuritis and to disclose an exceptional instance of a young individual with bilateral panuveitis and optic neuritis following the second dosage and second booster of the COVID-19 vaccine (Coronavac), and to.

**1.1. Case Report:** Two weeks after the second dosage of the Coronavac COVID-19 vaccine, a 22-year-old woman presented with impaired vision and conjunctival congestion, for which she was assessed. She was given corticosteroid eye drops after being diagnosed with anterior uveitis. The symptoms aggravated three months after treatment. The patient fundus examination revealed vitreous hemorrhage, optic neuritis with secondary neovascularization of the para-disc, and bilateral panuveitis about 6-month after the first diagnosis. A course of systemic corticosteroids was administered to the patient, resulting in clinical benefit. The study adheres to the Tenets of the Declaration of Helsinki and the study is approved by the local ethical board of the Human Research Ethics Committee of Zhejiang Hospital. Informed consent was obtained from this participant included in this study.

**1.2. Conclusion:** Even though uveitis or optic neuritis after COVID-19 vaccines are rare, combined cases have not been previously reported. Our case illustrates the need for improved practitioner attention of COVID-19-vaccine-associated ocular inflammatory disorders.

## 2. Introduction

COVID-19, a pandemic triggered by a coronavirus disease driven by SARS-CoV-2 (serious acute respiratory syndrome coronavirus

2). It has showed unexpected impacts on the lives and lifestyles of humans, and debilitating impact on human society has prompted the science world to labor at an incredible rate. The vaccine has been proved efficient for the disease. Sinovac has generated CoronaVac in China, which is an inactivated vaccine, and has been approved effective so far [1]. The COVID-19 vaccine can lead to adverse events, including ocular complications. It has been reported several case studies on probable impacts of COVID-19 vaccination. Post-vaccination uveitis is a well-documented condition and is typically anterior, mild, while three cases were reported occurring in posterior uveitis [2-8]. Most findings we analyzed focused solely on instances with optic neuritis axis. Based on current data, this is the first reported case of this sort in our nation involving a young person who was vaccinated with CoronaVac; therefore, it has literature value.

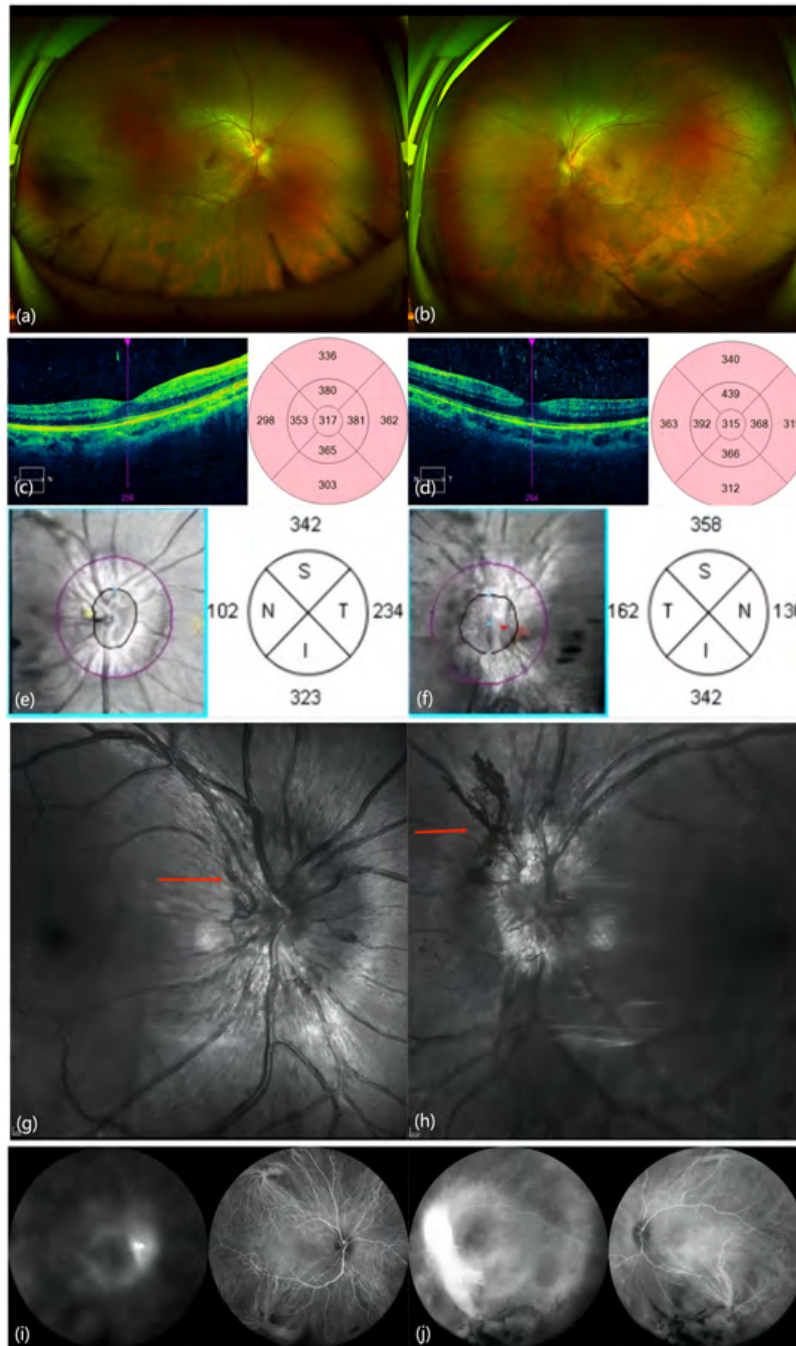
## 3. Case Report

A 22-year-old female was assessed for a blurred vision and conjunctival congestion that began two weeks after following the second dosage of the Sinovac CoronaVac vaccine (J07BX03). With a diagnosis of anterior uveitis by outside ophthalmologist, she was given corticosteroid eye drops. After three months of therapy, as the symptoms aggravated, she prompted referral to the clinic with left eye floater and blurred vision.

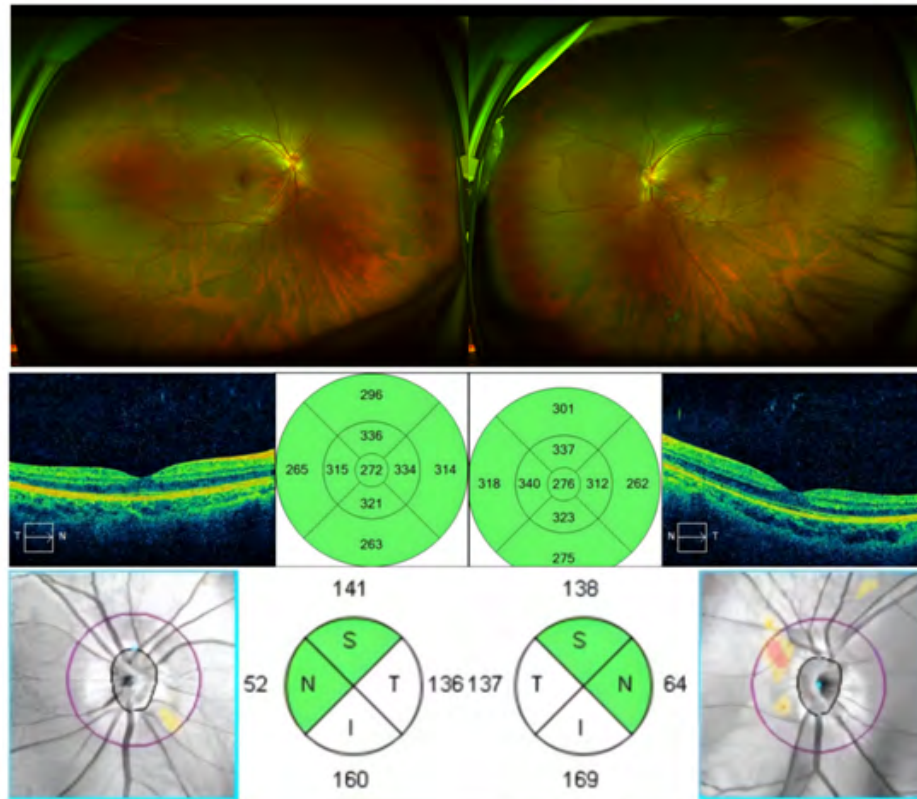
On our evaluation, the patient was presented with obvious conjunctival congestion, panuveitis inflammation, and vitreous hemorrhage in her left eye. The patient's prior medical record was normal; however, the patient's prior ocular record was significant for -2.0D myopia. Best-corrected visual acuity was 20/20 in both

eyes, and intraocular pressure was 15 mmHg. Using a slit-lamp examination, both eyes were discovered to have 2+ cells in the anterior chamber as well as the Tyndall sign. On dilated fundus examination, it was noted 2+ cells in the vitreous, neovascularization of the disc in the two eyes, and vitreous hemorrhage in the left eye. Optical Coherence Tomography (HD-OCT; Carl Zeiss Meditec, Dublin, CA, the USA) of the two eyes revealed diffuse thickening of retina. Infrared fundus photography revealed swollen optic disc, neovascularization of the disc in the two eyes. Fundus fluorescein

angiography (FFA) demonstrated hyperfluorescent staining of the optic and obvious hyperfluorescent leakage of the optic disc neovascular. Indocyanine green (ICG) imaging showed nothing. ESR, CRP, ANA, ANCA, antibody titer(Ab), MRI brain and orbit were within normal limits. Based on the clinical report, examination, and imaging results, bilateral panuveitis combined optic neuritis were diagnosed. We started her on a dose of oral prednisone 60 mg per day, tapering by 10mg every month. After 6-month treatment, the patient's symptom resolved with a significant reduction in panuveitis and a normal disc appearance (Figures 1 and 2).



**Figure 1:** At presentation, inflammatory cells in vitreous cavity, neovascularization of the para-disc in both eyes and vitreous hemorrhage in the left eye (a and b). HD-OCT showing diffuse thickening of macular and obvious swollen optic (c, d,e and f). Infrared fundus photography revealed swollen optic disc, neovascularization of the para-disc in both eyes (g and h, red arrow). Fundus autofluorescence (FAF) demonstrated diffuse hyperautofluorescence in the retina, hyperfluorescent staining of the optic and obvious hyperfluorescent leakage of the neovascular (i and j).



**Figure 2:** After systemic steroid treatment, the fundus examination revealed vitreous hemorrhage absorption (k and l), optic edema and thickening of retina regressed and neovessel disappeared (m, n, o and p).

#### 4. Discussion

With the aim of ending COVID-19 pandemic, the Food and Drug Administration (FDA) approved vaccines against the COVID-19 virus in late 2020 [9-11]. Earlier study has established a connection between COVID-19 disease and direct or indirect ocular problems [12-20]. Infection with COVID-19 has been linked to conjunctivitis, scleritis, orbital inflammatory illness, phlyctenular keratoconjunctivitis, and retinal involvement. Consequently, it is crucial to study the connection between COVID-19 vaccination and ocular problems [20-22]. Numerous reports and retrospective case investigations have documented potential harmful effects of vaccines. Pichi et al. reported case sequence of ocular adverse impacts following vaccination with Sinopharm COVID-19 within 5-12 days [20]. Postvaccine optic neuritis is a known but unusual adverse impact. Although the specific mechanism is unknown, it is widely assumed that the vaccine stimulates the immune system of the host, which then leads to the activation of T cells, which destroys the myelin sheath of optic nerve [23-26].

Considering the substantial correlation between uveitis and immunological phenomena, it would be predicted that vaccination against COVID-19 and uveitis have some association. Rabinovitch et al. undertook the biggest and only multicenter investigation till now exploring a correlation between uveitis and COVID-19 vaccination [27]. The researchers of the investigation looked into 23 eyes belonging to 21 patients with a mean age of 51.3 years who had

acquired uveitis following vaccination against COVID-19 with the BNT162b2 vaccine. Two separate studies have established a link between choroiditis and vaccination against COVID-19. But there are no panuveitis cases have been reported, not to mention panuveitis combined optic neuritis. In addition, this patient developed neovascularization of the para-disc and vitreous hemorrhage in the left eye, which is not common in a young individual. We hypothesized that the second dose of vaccine activated the immune system and caused panuveitis and optic neuritis, leading to long-term optic edema and ischemia and developed secondary neovascularization. The most effective way of treatment is steroids. After systematic steroids treatment, vitreous hemorrhage absorbed, optic edema regressed and neovessel disappeared. demonstrates the significance of vaccination history and fundus inspection.

#### 5. Conclusion

In conclusion, it is anticipated that the significant results of our research will make ophthalmologists conscious of uncommon and temporary conditions of post-COVID-19 vaccination such as uveitis and optic neuritis. Early steroid therapy leads to outstanding results.

#### 6. Declarations

##### 6.1. Permission for Publishing

Unapplicable.

## 6.2. Availability of Data and Material

The datasets obtained and examined during the ongoing inquiry research are available from the corresponding author upon appropriate request.

## 6.3. Competing Interests

The writers report having no conflicting priorities.

## 6.4. Funding

Not relevant.

## 6.5. Contributions of Authors

collecting and analyzing data (YMD, ZYW, MY); drafting of the main paper and prepared figures (YMD); article critique (MY, JHX). The finished manuscript has been read and confirmed by all writers.

## 6.6. Acknowledgements

Unapplicable.

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