

Bilateral choroidal effusion following vaccination against SARS-CoV-2 virus

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An 80-year-old systemically stable female presented with sudden blurring of vision post the first dose of Covishield™, a non-replicating viral vector vaccine. On examination, she was found to have bilateral serous choroidal effusions. A thorough systemic and ocular workup was performed to rule out other causes of choroidal effusion. The effusions resolved with tapering doses of oral and systemic steroids. To the best of our knowledge, at the time of submission, this is the first case of choroidal effusion being reported after the coronavirus disease 2019 (COVID-19) vaccine.

Key words: Choroidal effusion, COVID-19 vaccine, Covishield, non-replicating viral vector vaccine, SARS-CoV-2 infection

Coronavirus disease 2019 (COVID-19), a highly contagious viral infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), resulted in a globally catastrophic pandemic. As of April 2022, COVID-19 infection caused by the SARS-CoV-2 virus has affected 500 million people worldwide causing death of 6.2 million people as per World Health Organization (WHO) reports. Although the virus is known to primarily affect the respiratory system, in addition to this, varied ocular manifestations are being widely documented in the literature. Currently, there are four types of COVID-19 vaccines available, the messenger RNA vaccines, the protein sub-unit vaccines, the vector vaccines, and the whole virus vaccines.^[1] Among the 33 approved vaccines worldwide, two vaccines are predominantly in use in India – Covishield, a non-replicating viral vector vaccine (Oxford/AstraZeneca formulation) manufactured by the Serum institute of India, and Covaxin, an inactivated whole virus vaccine, manufactured by Bharat Biotech, India. Systemic and ocular adverse events including re-activation of uveitis, corneal graft rejections, nerve palsies, and retinal manifestations have been shown to occur within 14 days following vaccination.^[2]

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Case Report

An 81-year-old female came with complaints of painless blurring of vision in both eyes (OU) for the past 2 days. She was a known case of type 2 diabetes mellitus, systemic hypertension, and hypothyroidism, for which she was on tablet metformin 500 mg BD, Amlodipine 5 mg OD, and Eltroxine 50 micrograms OD. She had no history of COVID-19 infection. She had no significant past ocular history except for cataract surgery in both eyes performed 5 years ago. She was not on any glaucoma medications. She had taken the first dose of Covishield™ vaccine 7 days ago. On examination, the blood pressure (BP) was 130/80 mm hg and random blood glucose was 91 mg/dl. The best corrected visual acuity in both eyes was 6/9, N6. The intra-ocular pressure (IOP) by applanation tonometry was 19 in OD and 17 in OS. Anterior segment examination showed normal AC depth with pseudophakia. Fundus examination of OU revealed a normal posterior pole with choroidal detachment (CD) nasally, inferiorly, and temporally in OD and nasally, supero-nasally, temporally, and infero-temporally in OS [Fig. 1]. OU B scan ultra-sonography [Fig. 2] was performed, which revealed serous CDs with no evidence of intra-ocular inflammation, choroidal thickening, or mass lesions. The axial length was 22.34 mm in OD and 23.01 mm in OS. Physician opinion was also sought, and the systemic status of the patient including renal parameters was found to be stable. She was started on topical 1% prednisolone acetate eye drops eight times with homatropine eye drops twice a day along with tablet prednisolone 1 mg/kg body weight in tapering doses. Baseline

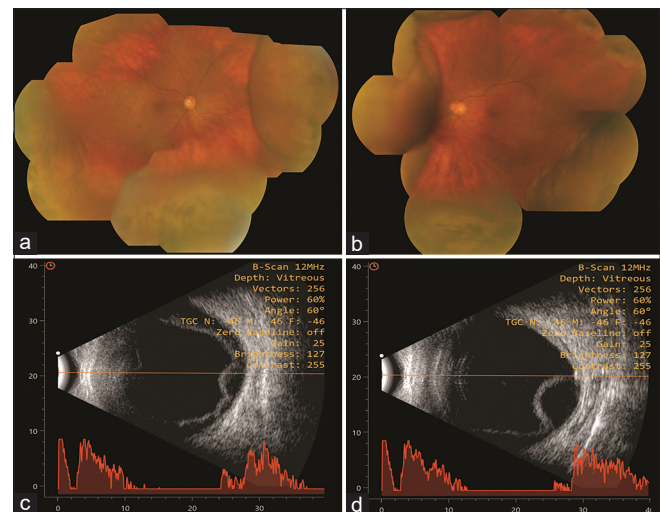


Figure 1: Color fundus photograph of the right eye and left eye (a and b) showing multiple peripheral serous choroidal effusions and the corresponding B-scan images of the right and left eyes (c and d)

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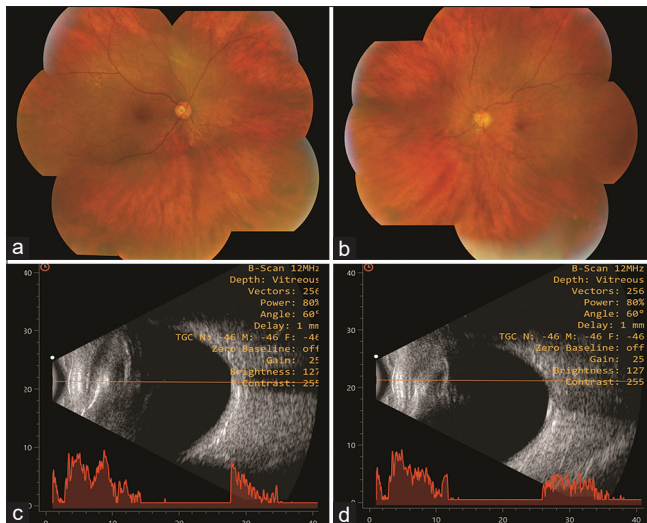


Figure 2: (a-d) Color fundus images of the right and left eyes with the corresponding B-scan images showing complete resolution of choroidal effusions with oral and topical steroid therapy

blood investigations including peripheral smear and magnetic resonance imaging (MRI) of the orbit and brain were performed to rule out the possibility of primary or secondary malignancies, which were also found to be normal. One week later, her best corrected visual acuity (BCVA) was 6/6 in OD and 6/9 in OS with resolution of symptoms and serous choroidal effusions in both eyes. Her oral and topical steroids were tapered and stopped.

Discussion

Choroidal effusions are abnormal accumulations of fluid in the supra-choroidal space which can occur secondary to multiple causes, including inflammatory, neoplastic, vascular, drug-induced, and sometimes without any inciting etiology.^[3] Rarely, they have been documented post viral infections such as dengue^[4] and viral encephalitis.^[5] Deori *et al.*^[6] had recently documented a case of a 28-year-old female who developed choroidal effusion which led to high IOP and axial myopia following anterior displacement of the iris lens diaphragm in a patient within 2 weeks of COVID-19 infection.^[6] She which was treated with intravenous methyl prednisolone and IOP-lowering medications. Mansour *et al.* have reported a case of unilateral choroidal effusion following H1N1 vaccination.^[7] Numerous ocular adverse events have been documented following COVID vaccination in the Indian population.^[8] The mechanism of ocular adverse effects post vaccination is assumed to be probably because of molecular mimicry secondary to similarities between uveal and vaccine peptides, antigen-specific cell and antibody-mediated hyper-sensitivity reactions, and inflammatory damage induced by adjuvants included in vaccines simulating innate immunity response.^[9] Adenoviral vector vaccines can cause ocular disease by inducing an immunologic response to the spike antigen or to components of the chimpanzee or human adenovirus. The adenoviral vector-mediated B-cell immune response may also cause a dysimmunological process.^[10] Our patient may also have developed a similar reaction which led to the development of choroidal effusion, resolving with immuno-suppressive steroid therapy. In the study conducted by Testi *et al.*,^[2] only six (33.3%) among the total 18 patients had a similar reaction following the second dose. This indicates that all patients may

not have recurrence following repeated doses. The absence of other potential ocular and systemic risk factors and the temporal relationship with the vaccine made us attribute the occurrence of choroidal effusions as an adverse effect of vaccine.

Conclusion

Ocular adverse effects post vaccination may cause significant distress to the patient. Those with a history of ocular adverse effects need to be under close observation following subsequent doses for early recognition and management of recurrent reactions if any. The aim of the authors is to portray the potential ophthalmic side effects which can occur following vaccination and emphasize the need for further studies to prove a causal link between ocular adverse events and the vaccine, factors predicting the incidence of such events, and profiles of predisposed individuals and establish the safety of vaccines in individuals with a history of adverse effects.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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