A rare case of cortical blindness following vaccination against SARS-CoV-2

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A 61-year-old male presented with sudden loss of vision in both the eyes about 8 days after the first shot of coronavirus disease 2019 (COVID-19) vaccine (Covishield). On examination, the visual acuity was no perception of light in both the eyes. Contrast-enhanced magnetic resonance imaging (MRI) with diffusion-weighted imaging showed acute cerebral infarcts involving bilateral parieto-occipital region. Considering the temporal correlation with the vaccine shot and absence of any other precipitating factor, we hypothesized that this was probably an immunologic response to the vaccine.

Key words: Cortical blindness, COVID-19, occipital infarct, vaccine

Venous and arterial thrombotic events have been reported in about 30% of coronavirus disease 2019 (COVID-19) patients. Endothelial susceptibility to severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2) along with exacerbated proinflammatory cytokine response has been hypothesized to be the underlying cause. As the pandemic is evolving and vaccines are being developed, a plethora of neuro-ophthalmic associations have come to light. Adenoviral vector vaccines, especially ChAdOx1 nCov-19 vaccine, have also been reported to cause thrombotic events in rare instances. Transient reduction in visual acuity and transient visual field defects are frequently reported post-vaccination. Left congruous hemianopia shortly after vaccination with CoronaVac was noted in a 42-year-old ophthalmologist. Here, we report a case of bilateral cortical blindness following vaccination against SARS COVID-19.

Case Report

A previously healthy male patient in his 60s presented with sudden loss of vision in both the eyes a week after the first shot of COVID-19 vaccine (Covishield™). He had a history of an episode of mild fever after the vaccine, which lasted for 2–3 days along with headache and an episode of blurring of vision for a few hours, for which he did not visit any hospital. On presentation, the visual acuity was no perception of light in both the eyes. The pupillary reactions and fundus evaluation were within normal limits. Contrast-enhanced magnetic resonance imaging (MRI) with diffusion-weighted imaging showed acute cerebral infarcts involving bilateral...
The COVID-19 pandemic is an ongoing global pandemic caused by a novel virus that was first identified in the city of Wuhan. In this ongoing battle, a major breakthrough was the authorization of the first vaccine against COVID-19 in December 2020. While these vaccines have helped to reduce the severity and death related to the virus, a plethora of ophthalmic manifestations in association with the vaccines have been reported. In India, the three vaccines granted authorization by the Central Drugs Standard Control Organization (CDSCO) are Covishield (AstraZeneca’s vaccine manufactured by the Serum Institute of India), Covaxin® (manufactured by Bharat Biotech Limited), and Sputnik-V. The overall effectiveness against severe COVID-19 is 69% with two doses of Covaxin and 80% with two doses of Covishield according to a study by the Indian Council of Medical Research (ICMR)-National Institute of Virology, Chennai. Covishield (ChAdOx1 nCoV-19 coronavirus vaccine) is a replication-deficient chimpanzee adenoviral vector ChAdOx1, containing the SARS-CoV-2 structural surface glycoprotein antigen gene. It is produced by the Serum Institute of India, Pune, based on the Oxford-AstraZeneca vaccine.

There have been reported incidences of thrombosis after receiving a first immunization with ChAdOx1 nCoV-19. Schultz et al. reported venous thrombosis and thrombocytopenia in a case series of five patients, and four of them presented with intracerebral infarctions. The patients had high levels of antibodies to platelet factor 4 - polyanion complex. Their
investigations suggested that immune complexes similar to those seen in patients of autoimmune heparin-induced thrombocytopenia in the serum of these patients were responsible for the clinical symptoms.

Even ophthalmological complications of superior ophthalmic vein thrombosis (SOVT) have been reported with the use of viral vector-based ChAdOx1 nCoV-19 vaccine. Bayas et al. reported a case wherein a previously healthy patient developed bilateral SOVT and idiopathic thrombocytopenic purpura on day 10 and 18 after vaccination, respectively. Another patient, a young female, reported by Panovska-Stavridis et al. manifested with SOVT, thrombocytopenia, along with mild fever 10 days after vaccination.

A search performed in EudraVigilance on March 11, 2021, for cases of “embolic and thrombotic events” (Standard MedDRA Queries) revealed 269 cases. Time of symptom onset ranged from 0 to 16 days after vaccination, and the median age of affected patients was 70 years. Thrombosis of hepatic vein, deep veins of the leg, mesenteric vein, and cerebral venous sinus was reported. There were also fatal cases of cerebrovascular accident in those aged 79 years and older who took the vaccine. The various causes hypothesized were possible quality defects, a particular excipient, or a product- or process-related impurity originating from a particular step in the manufacturing process, which may have triggered a similar immunologic response as seen in cases of heparin-induced thrombocytopenia. A possibility (though not supported by the negative polymerase chain reaction [PCR] tests) of development of COVID-19 infection post-vaccination was also considered, since COVID-19 infection is associated with tremendous thrombotic complications.

Moreover, adenoviral vector vaccines can cause vascular complications by inducing an immunologic response to the spike antigen or to the components of the chimpanzee or human adenovirus.

**Conclusion**

Here, we reported a case of a previously healthy 61-year-old male who presented with loss of vision following the first dose of Covishield vaccine. The Contrast Enhanced MRI revealed acute bilateral parieto-occipital infarcts. The rapid antigen test for COVID-19 was negative. Considering the temporal correlation with the vaccine shot and absence of any other precipitating factor, we hypothesized that this was probably an immunologic response to the vaccine.

**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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**Conflicts of interest**

There are no conflicts of interest.

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