



Acute reduction of visual acuity and visual field after Pfizer-BioNTech COVID-19 vaccine 2nd dose: a case report

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Abstract

Long-term and rare adverse effects of COVID-19 vaccines are unknown. Hence, it is important to report them to improve the safety profile of the vaccines and enhance their use worldwide. Here, we describe a case of acute visual impairment after Pfizer-BioNTech vaccine second dose.

Introduction

Coronavirus Disease 2019 (COVID-19) is a respiratory infection characterized by a strong sex bias [1] and that has already affected more than 170 million people causing more than 3,500,000 deaths worldwide. The Pfizer-BioNTech COVID-19 vaccine was approved in the US after an emergency use authorization issued by the US Food and Drug Administration (FDA) on December 11, 2020 [2]. The safety profile of the vaccine appears comparable with other virus vaccinations, even though, given the emergency situation, monitoring the long-term effects has not been possible [3, 4]. Thus, it is crucial to report any adverse reaction occurring after the vaccine distribution to the public.

Here, we report an unusual case of visual impairment following the administration of the 2nd dose of the Pfizer-BioNTech COVID-19 vaccine.

Case report

The patient received the 2nd dose of the Pfizer-BioNTech COVID-19 vaccine on the morning of February 2, 2021. After 3 days, on February 5 late morning, he reported a sudden onset of darkening of the visual field, described as

subjective reduction of visual acuity associated with visual distortion. However, the subjective nature of the ophthalmic symptoms was not better investigated since the symptoms disappeared on the same day and the patient preferred not to undergo instrumental evaluation.

The morning prior to showing visual symptoms, he reported unilateral, oppressive headache, mainly in his parietal to frontal lobe, without associated symptoms (noise or motion sensitivity, osmophobia, photophobia).

The patient, a white adult middle-aged male had no history of ocular problem or migraine, and he had never experienced visual acuity reduction previously.

Hours after the onset of the ocular symptoms, he reported light confusion, asthenia, and profound nausea. The severity of symptoms was such to require taking a sick leave from work. He took ibuprofen and eventually after a long rest, the symptoms, including ophthalmologic manifestation, disappeared. He also reported decreased orientation and awareness of his surroundings. Nausea manifested without vomiting, started about 1 h after his lunch.

Before the onset of this plethora of symptoms, he only reported low-grade fever and chills the night after the injection. This was followed by 3 days without side effects. All the symptoms, the time of onset, and duration are summarized in Table 1.

Of note, the patient tested positive for SARS-CoV-2 in summer 2020. Table 2 shows a detailed description of the patient's symptoms.

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Table 1 Time of onset, duration, and symptoms following the 2nd dose of Pfizer-BioNTech COVID-19 vaccine administration

Symptoms	Time of onset	Duration	Severity
Low-grade fever (< 37.5 °C)	1st day	Overnight	Mild
Chills	1st day	Overnight	Mild
Headache	3rd day	Hours	Mild
Reduction of visual acuity	3rd day	Hours	Moderate
Reduction of the visual field	3rd day	Hours	Moderate
Dizziness and fatigue	3rd day	Hours	Moderate to severe
Itchy rash on the chest area	3rd day	3 days	Mild to moderate
Diarrhea	3rd day	3 days	Moderate
Nausea	3rd day	Hours	Severe

Table 2 Time of onset, duration and symptoms during SARS-CoV-2 infection

Symptoms	Time of onset	Duration	Severity
Low-grade fever (< 37.5°)	31st July 2020	4 days	Mild
Nasal congestion with sporadically sneezing	31st July 2020	4–6 days	Mild
Tension headache	31st July 2020	1 day	Mild
Decreased taste and olfaction	5th–6th August 2020	8–10 days	Severe
Neuropathic pain in the palms of the feet	12th August 2020	5–7 days	Mild to moderate
Rush in legs and arms	12th August 2020	2–4 days	Mild
Arrhythmias	16th August 2020	8 months	Mild to severe

The patient took acetaminophen as needed, with benefit. From the second week of August, the symptoms started to improve without treatment. He was confirmed SARS-CoV-2 positive after the nasal swab on August 6, 2020. The COVID-19 confirmation was followed by headache requiring acetaminophen, probably caused by the stress associated with the new condition and the stressful follow-up at work. On the 13th–14th August, the sense of taste and olfaction improved, and on 17th, he tested again and resulted negative.

Discussion

The nucleoside-modified RNA vaccine (BNT162b2), which encodes the full-length SARS-CoV-2 spike protein, is the first COVID-19 vaccine approved by the FDA and distributed in the USA. The most common side effects are mild to moderate pain, swelling and redness at the site of injection, chills, tiredness and headache. Diarrhea, nausea, vomiting, dermatitis, and deep tiredness have also been described [3, 4]. These symptoms occur mostly after the second dose and usually start between the 1st and 2nd day after the injection and last for few days.

Several ophthalmic conditions have already been described following the administration of various vaccinations. Uveitis is a form of eye inflammation that is characterized by blurred and decreased vision, floaters, and sensitivity to light; vaccine-induced uveitis is an already-known condition associated with different vaccinations. Interestingly, most of the cases of vaccine-induced uveitis are related to the Hepatitis B vaccine, which contains the HepB surface antigen, inserted into yeast cells using recombinant DNA technology [5]. In addition, a case of posterior uveitis [6] and a case of pan-uveitis with

posterior retinal detachment [7] following HPV vaccination were recently described.

Moreover, flu vaccination was associated with numerous ophthalmic adverse effects, including uveitis, multiple evanescent white dot syndrome (characterized by central flashing lights) [8] and, also, acute macular neuroretinopathy [9]. Furthermore, ocular manifestations of COVID-19 are well documented. The most common condition is conjunctivitis; episcleritis and keratitis have also been described. Intriguingly, even though the relationship remains uncertain, SARS-CoV-2 could affect the retina and the optic nerve [10].

Our report has several limitations: (1) subjective nature of the symptoms; (2) absence of instrumental neurologic or ophthalmological evaluation to objectively characterize the symptoms.

Nevertheless, given the emergency and the consequent impossibility of conducting long-term observational studies for the new Pfizer-BioNTech vaccine safety profile, it is crucial to report any possible side effect following its administration. Considering the relation between the 2nd dose and the symptoms' time of onset, the documented ocular manifestations as side effects of several other vaccinations, and the well-known COVID-19 ocular

symptoms, the ophthalmic symptoms here reported might be considered as a rare adverse effect of the COVID-19 vaccine, even though more detailed evaluation is needed.

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Declarations

Ethics declaration The authors obtained the patient's written informed consent for the publication of the present case report.

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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