A Case of Acute Central Serous Chorioretinopathy After Immunization with COVID-19 mRNA Vaccine

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ABSTRACT

In the COVID-19 pandemic, which causes high mortality and morbidity, promising developments are achieved as a result of the global vaccination campaign. However, there is an increase in reported side effects with widespread vaccination. In this report, we present a 44-year-old female patient who presented with unilateral central serous chorioretinopathy (CSCR) three days after the first injection of the BNT162b2 COVID-19 vaccine. Although the possibility of coincidence cannot be excluded, our case provides support for the few cases of CSCR after COVID-19 vaccination in the literature.

Keywords: BNT162b2, central serous chorioretinopathy, COVID-19, mRNA vaccine.

INTRODUCTION

Coronavirus disease-2019, a severe, acute respiratory distress syndrome, is caused by coronavirus-2 (SARS-CoV-2), which was first seen in Wuhan City, China. It was rapidly evolved to a pandemics. The global vaccination is the most effective strategy against fatal COVID-19 pandemics. In Turkey, inactive vaccine (CoronaVac, Sinovac) and mRNA vaccine ((BNT162b2, Pfizer-BioNTech) are used in vaccination campaign against COVID-19. In the literature, there is increasing number of case reports on local and systemic adverse effects of COVID-19 vaccines[1, 2]. Here, we aimed to present a case developed central serous chorioretinopathy after first dose of BNT162b2 COVID-19 vaccine. We also discussed whether it is a vaccine-related entity or a coincidence.

Case report

A 44-years old woman without known systemic or ocular disease presented to our clinic with blurred vision in the left eye. In her history, there was no recent or chronic drug use or history of emotional stress. The history was incompatible with type A personality. There was no pregnancy. There was also no family history of ocular diseases. The patient reported that she got first dose of BNT162b2 COVID 19 vaccine 3 days before presentation and had no complaint other than pain at injection site. The patient had no history of COVID-19 infection before vaccination. In the ophthalmologic examination, the best-corrected value was 20/20 and 20/50 in the right and left eyes, respectively. The intraocular pressure (IOP) was measured as 13 mmHg in both eyes. Ocular movements and pupil size were normal. Direct and indirect light reflexes were intact and no relative afferent pupil defect was observed. In anterior segment examination, no abnormal finding was detected. In the dilated fundus examination, there was no abnormality in the right eye while there was disrupted foveal reflex and swelling in the left eye. On optical coherence tomography (OCT), no abnormal finding was detected in the right eye while subfoveal serous retinal detachment was observed in the left eye (Figure 1). On enhanced dept imaging optical coherence tomography (EDI-OCT), central choroid thickness was 334 µ in the right eye and 324 µ in the left eye. Acute central serous chorioretinopathy was diagnosed in the left eye. In the control visit on month 1, it was found that BCVA was improved to 20/20 in the left eye with normal fundus examination. On EDI-OCT, it was seen that the subfoveal fluid in the left eye was completely resolved without finding of pachychoroid (Figure 2). The patient

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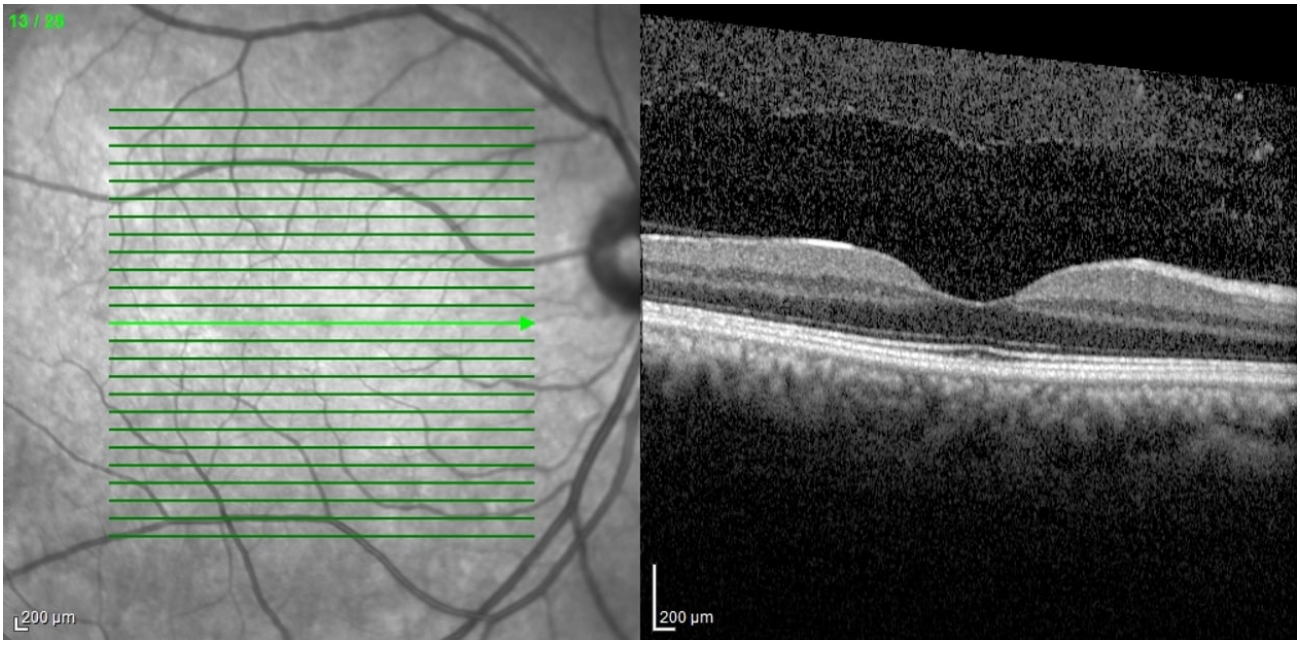

Figure 1: *OCT images at presentation . a) Normal appearance of right eye b) subfoveal fluid in the left eye.*

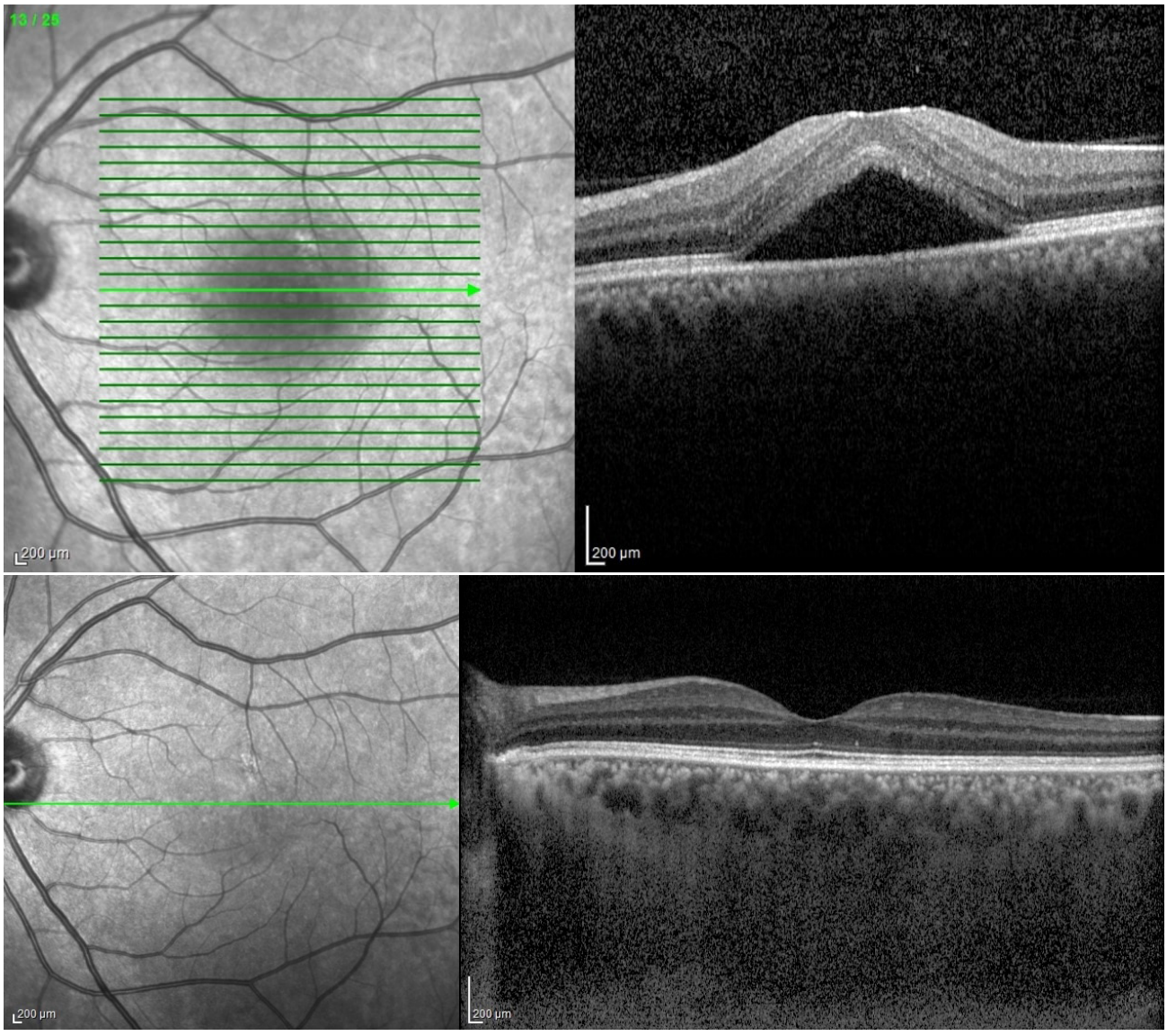

Figure 2: *On EDI-OCT obtained on month 1, it is seen that subfoveal fluid was completely resolved without finding of pachychoroid.*

received no COVID-19 vaccine during 6 months follow-up and no recurrent subfoveal fluid was observed at monthly controls.

DISCUSSION

Several ocular complications including facial nerve paralysis, abducens nerve paralysis, newly onset Graves disease, episcleritis, anterior scleritis, anterior uveitis, multifocal choroiditis, reactivation of Vogt-Koyanagi-Harada disease, multiple evanescent white dot syndrome, acute macular neuroretinopathy, paracentral acute middle maculopathy and CSCR have been reported following COVID-19 vaccination[3]. Previously, inflammatory or autoimmune ocular adverse effects were defined following human papilloma virus, hepatitis B and influenza virus vaccines[4-6]. Molecular mimicking, direct inflammatory attacks, vaccine adjuvant-related immune complementary complex accumulation antigenic cross-reactivity are mechanisms implied in inflammatory/autoimmune adverse effects following vaccination include[7].

Central serous chorioretinopathy (CSCR) is characterized as serous retinal detachment in macula in young and middle-aged adults. Serous retinal detachment may be accompanied by serous retinal pigment epithelial detachment. Although acute CSCR resolves spontaneously within a few months, the natural course of the disease is usually recurrent attacks or chronicity[8, 9]. In general, acute CSCR has favorable prognosis with spontaneous recovery in 80-90% of cases within 2-3 months[10] and there are reported cases with spontaneous recovery within a month as similar to our case.[11] Although etiology and pathogenesis hasn't been elucidated in acute CSCR, it is thought that CSCR results from choroid vascularity with increased permeability against subretinal fluid. In the studies on relationship between glucocorticoids and CSCR, there is evidence suggesting that endogenous and exogenous glucocorticoids are involved in the development of choroid vasculopathy[12]. Type A personality, emotional stress, systemic hypertension, pregnancy, corticosteroids and sympathomimetic agent use are known risk factors for CSCR.[9] In the literature, there are cases developed CSCR following influenza, anthrax and smallpox vaccination[13-15].

As a result of the global COVID-19 vaccine campaign, millions of doses of vaccine were administered and a few CSCR cases thought to be related with COVID-19 vaccines has been reported in the literature. Fowler et al. reported a man who presented with unilateral CSCR 3 days after first dose of BNT162b2 COVID-19 vaccine and completely recovered by spironolactone therapy (50 mg daily) within 3 months. Delbarre et al. reported unilateral CSCR developed in a 38-years old man 7 days after first dose of BNT162b2 COVID-19 vaccine[16]. A second dose of vaccine, which did not increase the subretinal fluid but could contribute to the persistence of the subretinal fluid, was also administered to the patient who had no risk factors other than the thick choroid. The visual acuity was measured as 20/630 in the eye with CSCR 4 months after presentation[17].

Several mechanisms have been proposed in attempt to elucidate pathophysiology of relationship between mRNA vaccines and CSCR. The first hypothesis has proposed that mRNA vaccines might have led increased serum cortisol levels. Although there is no study about this issue in the literature, it was shown that serum cortisol level was increased by 2-folds following tetanus vaccinee[18]. On the other hand, mild inflammatory response induced by vaccines leads cytokine release and inhibition of glucocorticoid receptor expression[19]. Again, in experimental studies, it was shown that polyethylene glycol, an excipient in mRNA vaccine, causes thickening in choroid vascularity and choroid neovascularization[20].

Currently, it seems that it isn't possible to confirm a causal relationship between central serous chorioretinopathy and COVIDd-19 vaccine. However, in CSCR cases reported following COVID-19 vaccine and our case, the temporal relationship between first dose and onset of impairment in visual acuity, low incidence of CSCR (9.9: 100, 000) and lack of risk factors in some cases suggest a causal relationship. However, it is difficult to establish a causal relationship since most publications are case reports rather than being controlled studies. In addition, as suggested by Jampol et al., it should be kept in mind that there may be no relationship when rare symptoms occurred in relation with widespread events such as COVID-19 vaccination[21]. Given the millions of doses of vaccines administered through different mechanism, causal relationship between ocular events and vaccines remains to be unclear.

In conclusion, given the limited samples in the literature, our case is valuable regarding this potential relationship and one of the limited cases reported. By increasing number of cases, the pathophysiology of mRNA vaccine and CSCR development will be clarified.

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