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Received: October 24, 2022

Accepted: January 8, 2023

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No potential conflict of interest relevant to this article was reported.

Herpes zoster ophthalmicus after COVID-19 vaccine booster in healthy younger adult: a case report

There were growing reports of herpes zoster reactivation after the coronavirus disease 2019 (COVID-19) vaccination, including a more severe form, herpes zoster ophthalmicus (HZO). A 35-year-old male presented HZO in his left V1 dermatome 10 days after his COVID-19 vaccine booster with Moderna (messenger RNA-1273). He had no history of chronic disease, immunocompromised, autoimmune, malignancy, or long-term immunosuppressive drug use. The rash improved without any further complications after being treated with oral valacyclovir for 7 days. This was a unique case of HZO after the COVID-19 vaccine in a booster setting in healthy younger adults. The association of herpes zoster after a COVID vaccine remained inconclusive and potentially coincidental, especially without the known risk factor. However, we would like to add a report to increase awareness among physicians and the general population, for early recognition and treatment with an antiviral.

Keywords: Herpes zoster ophthalmicus, COVID-19 vaccines, 2019-nCoV vaccine mRNA-1273, Case report

Introduction

The disease severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or coronavirus disease 2019 (COVID-19) has spread throughout the world since the end of 2019. The clinical manifestations of COVID-19 disease vary from respiratory, digestive, nervous, and dermatologic symptoms. The high number of cases and deaths due to COVID-19 increases the urgency for holding a COVID-19 vaccination. In Indonesia, the first COVID-19 vaccination was carried out on January 13th, 2021, and was divided into two phases. The first phase (January–April 2021) was focused on healthcare workers, public officials, and the elderly, mainly using Sinovac and Sinopharm, an inactivated virus vaccine. The second phase (April 2021–March 2022) targeted the general public and used many vaccine platforms including viral vector vaccine (AstraZeneca, Cambridge, UK) and messenger RNA (mRNA) vaccines (Pfizer-BioNTech [Pfizer, New York, NY, USA], Moderna [Cambridge, MA, USA]) [1,2]. The most common adverse events across vaccination platforms are pain at the injection site, fever, headache, nausea, and vomiting. Since early 2021, there were growing reports of herpes zoster reactivation (reactivation of varicella-zoster virus [VZV]) after COVID-19 vaccination. Herpes zoster ophthalmicus (HZO) accounts for 10%–20% of all herpes zoster cases [3]. Here we reported the HZO case after the COVID-19 vaccine booster in healthy younger adults.

Case Report

A 35-year-old male patient came with the complaint of a painful erythematous papule on the forehead. Initially, the lesion was tender and itchy, which later became painful with a burning sensation (Fig. 1A). Three days later vesicles started to appear, accompanied by pain in the left ear and left jaw (Fig. 1B). The left eye was watery and sometimes there was eye discharge. The patient had his COVID-19 vaccine booster with Moderna (mRNA-1273) 10 days before. The patient had no history of allergy, chronic disease, immunocompromised disease, autoimmune, malignancy, or long-term immunosuppressive drug use. He had a chickenpox history at the age of 5 years. On physical examination, there was an erythematous macular rash on the medial superior palpebra, conjunctival hyperemia, and slight eye secretions. Other eye examinations were within normal limits. The patient was diagnosed with HZO with left V1 dermatome and received oral valacyclovir 500 mg thrice a day for 7 days. The rash improved without any further complications. The patient provided written informed consent for the publication of the research details and clinical images.

Discussion

Herpes zoster is a disease caused by the VZV. The virus will remain in the neuronal ganglia of different nerve roots after recovery and can be reactivated at any time [4]. The major risk factor for VZV reactivation is advanced age (90% of cases) [5]. Another study mentioned the mechanism of VZV reactivation depends on endogenous and exogenous stimuli such



Fig. 1. (A, B) Left herpes zoster ophthalmicus (HZO). Presence of a typical HZO eruption in the left V1 dermatome. Informed consent for publication of this image was obtained from the patient.

as advanced age, physical and emotional stress, immunosuppression, ultraviolet exposure, and tissue damage [6].

Several case reports mentioned VZV reactivation after COVID-19 vaccination, including the Moderna vaccine. Vaccine-induced immunomodulation is proposed as a mechanism of VZV reactivation cases in patients with COVID-19 and after vaccination against hepatitis A, rabies, and influenza [5]. The risk of herpes zoster increases because of the decrease of cell-mediated immunity by causing lymphopenia and decreasing CD3+, CD4+, and CD8+ T cells. Psychogiou et al. [7] postulated that because of a massive shift of naive CD8+ cells, the VZV-specific CD8+ cells are not capable of controlling VZV temporarily.

Moderna (mRNA-1273 vaccine) as an mRNA vaccine mimics the action of the virus SARS-CoV-2 but without generating infection. Vaccine-induced modulation of the host's immune system makes part of the immune system activate and others are inhibited. For the activated part there are the humoral immune responses such as T helper (Th)2 lymphocytes, B lymphocytes, and antibody-releasing plasma cells and the inhibited part are Th1 and Th17 lymphocytes [8].

Lee et al. [9] reported herpes zoster after the first dose of the Moderna vaccine in a 65-year-old male with a history of psoriasis, Crohn's disease, and aspergilloma. This patient was managed with oral valacyclovir for 7 days. Channa et al. [10] reported a similar case after the second dose of the Moderna vaccine in an 81-year-old male with diabetes mellitus, hypertension, and coronary artery disease comorbidity. This patient received no specific treatment and the lesion resolved after 3 weeks.

Papasavvas et al. [11] and Thimmanagari et al. [12] reported two more specific VZV reactivation cases, HZO. The first HZO case report in the left V1 dermatome was observed after the first dose of the Moderna vaccine in a 72-year-old female without any comorbidity and the other two cases were seen following the Pfizer BioNTech vaccine. The similarity of these three cases was advanced age (65 years or older), and two of them had comorbidity, which can increase VZV reactivation after COVID-19 vaccination. The latter report presented an HZO case in a 49-year-old male with a history of bipolar disorder, schizophrenia, and dyslipidemia after Moderna vaccination. These two HZO cases were resolved with oral valacyclovir without any complication [11,12].

Herpes zoster cases found after the Moderna vaccination possessed similar characteristics to what had been reported in a systematic review. Martinez-Reviejo et al. [13] found 179

herpes zoster cases after COVID-19 vaccination from 55 studies. The mean age was 56.5 years old and slightly more prevalent in women (58.6%). Most cases were observed after mRNA vaccination (84.4%), after the first (68.2%) or second dose (12.8%), with a very small percentage in the booster setting (0.6%). The majority of cases presented with herpes zoster rash (86.4%), and HZO only accounted for 5.6% of cases. Desai et al. [14] reported risk factors of VZV reactivation including age more than 50 years old (36 cases), chronic disease (25 cases), immunology disorder (10 cases), malignancy (four cases), and psychiatric disorder (two cases) from 54 identified cases. Immunosenescence that happens in the elderly increases the risk for VZV reaction due to the lower level of T-cell immunity (CD4, CD8, and memory T cells) to maintain virus latency because of the dampened effect of T-cell immunity [15].

This case presents the unique case of HZO after Moderna in a booster dose setting in a healthy 35-year-old adult without any comorbidity. The association of herpes zoster after a COVID vaccine remained inconclusive and potentially coincidental. However, we would like to add to the literature a report of a similar case with particular characteristics to increase awareness among physicians and the general population, for early recognition and treatment with antiviral, which can prevent the progression of the disease or debilitating complications.

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