

Herpes Simplex Virus Encephalitis After mRNA-Based COVID-19 Vaccination: A Case Report

Jinyoung Oh, Sun Ki Min, Jeong Yeon Kim and Seong Ho Jeong*

Department of Neurology, Inje University Sanggye Paik Hospital, Seoul, South Korea

*Corresponding Author: Seong Ho Jeong, Assistant Professor, Department of Neurology, Inje University Sanggye Paik Hospital, Seoul, South Korea.

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Abstract

Acute encephalopathy after mRNA-based COVID-19 vaccination has been infrequently reported, however, there were no reports with confirmed pathogen. We here report a case diagnosed with herpes simplex virus encephalitis (HSE) after mRNA-1273 (Moderna COVID-19 vaccine) vaccination. We described the clinical presentation, laboratory and imaging findings, and treatment of a 52-year-old woman. The patient presented with symptoms of encephalopathy beginning two days after a dose of mRNA-1273. Cerebrospinal fluid analysis showed mild pleocytosis and elevated protein level. Brain MRI showed T2 hyperintensity in the left medial temporal lobe. Polymerase chain reaction multiplex test confirmed positive test for herpes simplex virus-1. Her symptoms gradually improved with the treatment of intravenous acyclovir. Although rare, HSE can occur in people with mRNA-based COVID-19 vaccination and should be considered in the setting of acute or subacute encephalopathy after vaccination.

Keywords: Herpes Simplex Virus Encephalitis; COVID-19 Vaccine; mRNA Vaccine

Introduction

Herpes simplex virus encephalitis (HSE) is a rare neurological condition that presents acute or subacute course with symptoms of headache, confusion, drowsiness, and seizure. HSE is regarded to be the result of reactivation of latent infection with herpes simplex virus (HSV) located in the ganglia of cranial nerves or direct passage along olfactory pathway [1].

Recently, possible relationship between mRNA-based COVID-19 vaccines (BioNTech/Pfizer and Moderna) and human herpesvirus (i.e. HSV or varicella zoster virus [VZV]) reactivation has been suggested [2-4]. Here we report a case of HSE after a first dose of mRNA-1273 (Moderna COVID-19 vaccine). To the best of our knowledge, this is the first case report of HSE associated with COVID-19 vaccine in the world.

Case Report

A 52-year-old woman presented to the emergency department of our hospital with headache, dizziness, vomiting, and confusion for 2 days on December 24th, 2021. She and her husband denied any past medical history. Also, they denied any history of psychiatric illnesses, alcohol use disorder, or other substances abuse. She had finished two doses of ChAdOx1 nCov-19 vaccine (Astrazeneca) four months ago

and received the first dose of mRNA-1273 vaccine on December 20th, 2021 (two days before the onset of symptoms). On admission, the patient was febrile, but her other vital signs were stable. The neurological examination was unremarkable, apart from disorientation to time, place, and person, naming difficulty and memory disturbances. Delayed recall, calculation and drawing interlocking pentagon were impaired in the Korean version of Mini-Mental State examination (K-MMSE) (final score: 17/30).

Her routine blood analyses were not remarkable except for mild hyponatremia (133 mEq/L). Polymerase chain reaction (PCR) test for COVID-19 was negative. Lumbar puncture with cerebrospinal fluid (CSF) studies was done, and it showed increased intracranial pressure (240 mmH₂O), mildly elevated protein levels (45.5 mg/dL, reference range = 15 - 45 mg/dL) with mild pleocytosis (lymphocytes: 5/uL, polymorphonuclear cells: 3/uL). Magnetic resonance imaging (MRI) of the brain revealed diffusion restriction and T2 hyperintensity in the left medial temporal lobe (Figure). The patient was treated with intravenous acyclovir (30 mg/kg/day) and dexamethasone (20 mg/day), pending on the microbiological results. On day 4, a PCR multiplex test of CSF for cytomegalovirus, human herpes virus-6, Epstein-Barr virus, HSV-2, VZV, and HSV-1 showed positive reaction in HSV-1. Test for antibodies causing autoimmune encephalitis was negative. Oxcarbazepine 600 mg/day was started based on the findings of electroencephalogram showing subclinical ictal waves on the left posterior region.

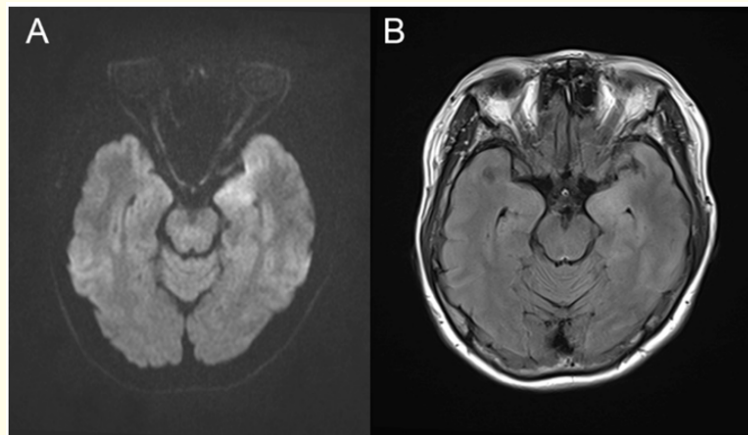


Figure: Brain MRI at time of initial presentation, including (A) diffusion-weighted and (B) fluid-attenuated inversion recovery (FLAIR) images.

Diffusion weighted and FLAIR images showed mild diffusion restriction and high signal intensity of the left medial temporal lobe, respectively.

During her hospital stay, she received a 14-day course of acyclovir for HSE, and her disorientation and memory impairment were gradually improved. On day 17, follow-up K-MMSE showed partially improved functions in delayed recall, calculation, and interlocking pentagon (Final score: 25/30). Also, patient and her husband reported significant improvement of the symptoms after treatment.

Discussion and Conclusion

With the continuation of the COVID-19 pandemic, neurological manifestations associated with the disease or vaccination have been reported [5,6]. However, previous reports about patients with COVID-19 or vaccine-related encephalitis failed to show the pathogen or the cause of encephalopathy. To the best of our knowledge, this is the first case of encephalitis with confirmed pathogen, HSV-1, after COVID-19 vaccination.

Recently, several scattered reports have suggested the possible association between mRNA-based COVID-19 vaccination and the reactivation of human herpesvirus (i.e. HSV-1 or VZV). Herbort, *et al.* reported 4 cases with the ocular reactivation of HSV-1 or VZV after mRNA COVID-19 vaccination [3]. Fathy, *et al.* reported 40 cases of VZV and HSV reported in the registry after mRNA COVID-19 vaccination [2]. Cifuentes, *et al.* found that all patients who developed herpes were vaccinated with mRNA-based vaccine, otherwise there was no herpesvirus infection in patients with ChAdOx1 nCov-19 vaccine [4].

Although the exact mechanism remains unknown, the reactivation of HSV-1 is thought to play a role in the development of HSE [1]. Some patients with COVID-19 infection showed the reactivation of these viruses, which is thought to be due to the immunosuppressive state associated with COVID-19 [7]. In line with this, the reactivation of herpesvirus in patients who received mRNA COVID-19 vaccine may be ascribed to the inflammatory process causing the imbalance of host immune system.

We experienced a patient diagnosed with HSE after mRNA-1273 vaccine with a causal and temporal relationship. Although it is evident that the vaccine's benefits outweigh any possible side effects of vaccination, clinicians should be aware of this complication that can be fatal if untreated. Also, we hope that the future studies will elucidate the relationship between the reactivation of herpesvirus and COVID-19 vaccination.

Conflict of Interest

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

Author Contributions

Conceptualization, Validation: Jeong SH; Data curation: Oh JY, Min SK; Supervision: Kim JY, Jeong SH; Writing-original draft: Oh JY; Writing-review and editing: Jeong SH.

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Bibliography

1. Bradshaw MJ and Venkatesan A. "Herpes simplex virus-1 encephalitis in adults: pathophysiology, diagnosis, and management". *Neurotherapeutics* 13.3 (2016): 493-508.
2. Fathy RA, *et al.* "Varicella-zoster and herpes simplex virus reactivation post-COVID-19 vaccination: a review of 40 cases in an International Dermatology Registry". *Journal of the European Academy of Dermatology and Venereology* 36.1 (2022): e6-e9.
3. Herbort CP Jr and Papasavvas I. "Effect of SARS-CoV-2 mRNA vaccination on ocular herpes simplex and varicella-zoster virus reactivation: should preventive antiviral treatment be given in known herpes patients". *Journal of Ophthalmic Inflammation and Infection* 11.1 (2021): 33.
4. Tejada Cifuentes F, *et al.* "COVID-19 vaccines and herpes infection". *Medicina Clínica* 157.12 (2021): e355-e356.
5. Tee TY, *et al.* "Acute encephalitis associated with SARS-CoV-2 confirmed in cerebrospinal fluid: First case in Malaysia". *Journal of Clinical Neurology* 17.3 (2021): 490-492.
6. Garg RK and Paliwal VK. "Spectrum of neurological complications following COVID-19 vaccination". *Neurological Sciences* 43.1 (2021): 3-40.
7. Katz J, *et al.* "Herpes simplex and herpes zoster viruses in COVID-19 patients". *Irish Journal of Medical Science* 191.3 (2021): 1093-1097.

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