HUMAN VACCINES & IMMUNOTHERAPEUTICS
2022, VOL. 18, NO. 5, e2068338 (2 pages)
https://doi.org/10.1080/21645515.2022.2068338

Taylor & Francis
Taylor & Francis Group

LETTER

COVID-19 vaccine associated transverse myelitis-Evusheld as an option when vaccination is not recommended due to severe adverse events

William E. Fitzsimmons

Department of Pharmacy Systems, Outcomes and Policy, University of Illinois College of Pharmacy, Chicago, IL, USA

ABSTRACT

Individuals who experience severe COVID-19-vaccine-related adverse reactions such as transverse myelitis may be precluded from receiving further vaccination to protect from SARS-CoV-2 infection. Although the mechanism of autoimmune spinal cord inflammation resulting in transverse myelitis is unclear, it may be safe to administer antibody therapy for preventing COVID-19. Recently, Evusheld, tixagevimab with cilgavimab, two spike-protein directed monoclonal antibodies were authorized by the U.S. FDA and U.K. MHRA for administration to individuals when vaccination is not recommended. We report the safe administration of Evusheld to a patient who experienced transverse myelitis 11 months previously as a result of receiving the Moderna mRNA vaccine. This patient has experienced no adverse events to Evusheld. Additional experience and data collection are warranted to determine the safety of this prophylactic therapy.

ARTICLE HISTORY
Received 4 April 2022
Revised 01 April 2022
Accepted 15 April 2022

Dear Editor,

Maroufi et al. reported a case of transverse myelitis after vaccination with the AstraZeneca COVID-19 vaccine, a modified chimpanzee adenovirus vector vaccine.[1] This severe adverse effect has also been reported with mRNA COVID-19 vaccines from Pfizer/BioNTech and Moderna, including the case that we reported.[2–14] As of 18 March 2022, the Vaccine Adverse Event Reporting System (VAERS) CDC Wonder database reports 154 events of myelitis or transverse myelitis with the Pfizer/BioNTech vaccine, 111 events with the Moderna vaccine and 40 events with the Janssen/J&J vaccine in the U.S. Not only are most of the patients who experience this vaccine-related severe adverse event contraindicated from receiving additional COVID-19 vaccines, they often receive prolonged courses of corticosteroids for the control of the spinal cord inflammation which may further increase infectious risk. Therefore, alternatives for protection from COVID-19 infections are warranted, especially in consideration of the BA.1 and BA.2 Omicron variants.

On 8 December 2021, the FDA issued an Emergency Use Authorization (EUA) for Evusheld (tixagevimab co-packaged with cilgavimab and administered together) for the pre-exposure prophylaxis (prevention) of COVID-19 in certain adults and pediatric individuals.[15] This included individuals with "a history of severe adverse reactions to a COVID-19 vaccine and/or component(s) of those vaccines, therefore vaccination with an available COVID-19 vaccine, according to the approved or authorized schedule, is not recommended." On 17 March 2022, the U.K. Medicines and Healthcare products Regulatory Agency (MHRA) approved Evusheld for use in adults who are unlikely to mount an immune response from COVID-19 vaccination or for whom vaccination is not recommended.[16]

Based on the U.S. FDA EUA, we pursued data on the safety of administering Evusheld to our patient who previously experienced myelitis associated with the Moderna mRNA COVID-19 vaccine. After failing to find information in the published literature, we contacted both AstraZeneca and the FDA. AstraZeneca indicated that patients who received any licensed or investigational COVID-19 vaccine were to be excluded from the PROVENT trial, which was the basis of the original EUA. Additionally, they indicated that a search of the published biomedical literature failed to identify any published case reports or controlled clinical studies that systematically evaluated the use of EVUSHELD in patients with severe neurological adverse events, such as transverse myelitis or Guillain-Barre Syndrome, after COVID-19 vaccination. Subsequently, we contacted Peter Stein, Director of Office of New Drugs, at U.S. FDA. He stated . . . "we do not have data submitted on the specific example you raised, although it would seem unlikely that this kind of cross-reaction would be a risk, even if theoretical possibility. I can note that, as for all monoclonals, human tissue cross-reactivity is a standard assay performed and Evusheld was negative in that assay."

The mechanisms by which COVID-19 vaccination may evoke an autoimmune response that is targeted to the spinal cord and may be associated with transverse myelitis include molecular mimicry, epitope spreading, polyclonal activation of B lymphocytes or activation of several pro-inflammatory cascades.[5,6] Based on these mechanisms, it was unclear if the administration of tixagevimab and cilgavimab, two monoclonal antibodies directed against distinct sites on the SARS-CoV-2 spike protein, would be safe to administer in a patient with COVID-19-vaccine-associated myelitis. We theorized that the specificity of these antibodies to the spike protein sites would be safer than the autoimmune response elicited by the COVID-19 vaccine. Subsequently our patient, a 64-year-old male who previously

CONTACT William E. Fitzsimmons wfitzsim@uic.edu University of Illinois College of Pharmacy, 833 S. Wood Street, Chicago, IL 60612, USA

experienced serious myelitis starting one day after administration of the second Moderna mRNA vaccination in April 2021, received intramuscular injections of 300 mg of each antibody in Evusheld on 8 March 2022. No adverse events were experienced over the last 3 weeks.

Based on this limited experience and the U.S. and U.K. approvals, Evusheld may be an important product to provide COVID-19 protection for the unfortunate individuals who previously experienced serious adverse reactions to the COVID-19 vaccine. However, additional data collection and reporting is strongly encouraged due to the paucity of data available.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

The author reported there is no funding associated with the work featured inthis article.

ORCID

William E. Fitzsimmons http://orcid.org/0000-0002-6189-5499

References

1. Maroufi SF, Naderi Behdani F, Rezania F, Tanhapour Khotbehsara S, Mirzaasgari Z. Longitudinally extensive transverse myelitis after Covid-19 vaccination: case report and review of literature. Hum Vaccin Immunother. 2022 Mar 3:1–4. Advance online publication. doi:10.1080/21645515.2022.2040239.
2. Fitzsimmons W, Nance C. Sudden onset of myelitis after COVID-19 vaccination: an under-recognized severe rare adverse event (May 5, 2021). SSRN. https://ssrn.com/abstract=3841558.
3. Sriwastava S, Sharma K, Khalid SH, Bhansali S, Shrestha AK, Elkhooly M, Srivastava S, Khan E, Jaiswal S, Wen S. COVID-19 vaccination and neurological manifestations: a review of case reports and case series. Brain Sci. 2022;12(3):407. doi:10.3390/brainsci12030407.
4. Hirose S, Hara M, Koda K, Natori N, Yokota Y, Ninomiya S, Nakajima H. Acute autoimmune transverse myelitis following COVID-19 vaccination: a case report. Medicine (Baltimore). 2021;100(51):e28423. PMID: 34941191; PMCID: PMC8701778. doi:10.1097/MD.0000000000028423.
5. Cabral G, Gonçalves C, Serrazina F, Sá F. MRI negative myelitis induced by Pfizer-BioNtech COVID-19 vaccine. J Clin Neurol. 2022;18(1):120–22. PMID: 35021291; PMCID: PMC8762507. doi:10.3988/jcn.2022.18.1.120.
6. Alabkal J, Rebchuk AD, Lyndon D, Randhawa N. Incomplete subacute transverse myelitis following vaccination with Pfizer-BioNtech COVID-19 mRNA vaccine: a case report. Cureus. 2021 Dec 16;13(12):e20460. PMID: 35070526; PMCID: PMC8760850. doi:10.7759/cureus.20460.
7. Miyaue N, Yoshida A, Yamanishi Y, Tada S, Ando R, Hosokawa Y, Yabe H, Nagai M. Refractory longitudinally extensive transverse myelitis after severe acute respiratory syndrome coronavirus 2 vaccination in a Japanese man. Intern Med. 2022;61(5):739–42. Advance online publication. doi:10.2169/internalmedicine.8747-21.
8. Khan E, Shrestha AK, Colantonio MA, Liberio RN, Sriwastava S. Acute transverse myelitis following SARS-CoV-2 vaccination: a case report and review of literature. J Neurol. 2022 Mar;269(3):1121–32. Advance online publication. doi:10.1007/s00415-021-10785-2.
9. Albokhari AA, Alsawas A, Adnan MH, Alasmari A, Aljuhani S, Almejalli M, Kedah H. Acute inflammatory transverse myelitis post-Pfizer-BioNtech-COVID-19 vaccine in 16-year-old. J Med Res Innov. 2021 Feb;5:47–50. doi:10.25259/JMRI_25_2021.
10. Eom H, Kim SW, Kim M, Kim YE, Kim JH, Shin HY, Lee HL. Case reports of acute transverse myelitis associated with mRNA vaccine for COVID-19. J Korean Med Sci. 2022;37(7):e52. PMID: 35191229; PMCID: PMC8860770. doi:10.3346/jkms.2022.37.e52.
11. Guarnaccia J, Creed M, Muriel S. Transverse myelitis as a first event of multiple sclerosis precipitated by Pfiizer=BioNTech COVID-19 vaccination. Neuroimmunol Rep. 2022;2:100074. doi:10.1016/j.nerep.2022.100074.
12. Caliskan I, Bulus E, Afsar N, Altintas A. A case with new-onset neuromyelitis optica spectrum disorder following COVID-19 mRNA BNT162b2 vaccination. Neurologist. 2022 Feb. PMID: 35184119. doi:10.1097/nrl.0000000000000420.
13. Fernandes J, Jaggernauth S, Ramnarine V, et al. Neurological conditions following COVID-19 vaccinations: chance or association? Cureus. 2022 ;14(2):e21919. doi:10.7759/cureus.21919.
14. McLean P, Trefts L. Transverse myelitis 48 hours after the administration of an mRNA COVID 19 vaccine. Neuroimmunol Rep. 2021;1:100019. doi:10.1016/j.nerep.2021.100019.
15. Tixagevimab and cilgavimab (Evusheld) for pre-exposure prophylaxis of COVID-19. Jama. 2022;327(4):384–85. doi:10.1001/jama.2021.24931.
16. Covid-19: evusheld is approved in UK for prophylaxis in immunocompromised people. Bmj. 2022;376. (Published 17 March 2022). doi:10.1136/bmj.o722.