IDCases 28 (2022) e01467

Contents lists available at ScienceDirect

IDCases

journal homepage: www.elsevier.com/locate/idcases

Case report

Vaccine hesitancy with a history of Guillain Barre Syndrome: Weighing the risks and benefits of SARS-CoV-2 vaccination☆

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ARTICLE INFO

Article history:
Received 20 February 2022
Accepted 4 March 2022

Keywords:
COVID-19 infection
COVID-19 vaccines
Guillain Barre Syndrome
Immunization

ABSTRACT

Since the beginning of the COVID-19 pandemic, great hesitancies regarding the COVID-19 immunization have existed. The most striking adverse events reported include thrombosis with thrombocytopenia syndrome (TTS), myocarditis, and Guillain Barre Syndrome (GBS). Post-vaccination GBS is known since the time of Influenza vaccination, but several cases of GBS have also been reported in the current COVID-19 vaccination era. As a result, our patient with a history of GBS post-Influenza vaccination, went unvaccinated for SARS-CoV-2, due to fear of GBS re-activation. Consequently, he contracted COVID-19 pneumonitis complicated with deep venous thrombosis, requiring a prolonged hospitalization. Weighing the risks and benefits of vaccination to COVID-19 is difficult, especially for people with a previous history of GBS related to Influenza vaccination. We reviewed and analyzed the reported cases of GBS temporary related to COVID-19 vaccination to determine the safety of their administration in those with a history of GBS.

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Introduction

Guillain Barre Syndrome (GBS) is an acute inflammatory demyelinating polyradiculoneuropathy that occurs after viral infections and vaccinations by temporal association at a frequency of 0.6–4/100,000 person/year worldwide [1]. The most common immunization that can cause an adverse event of GBS is Influenza vaccine. Yet, a study reviewing GBS cases during the Influenza seasons in 1992–1993 and 1993–1994, found an adjusted relative risk of 1.7 cases per 1 million Influenza vaccinations [2]. Hereby, we highlight a patient's choice of not being vaccinated against SARS-CoV-2 and that decision resulted in him having a severe COVID-19 pneumonitis requiring hospitalization. The risk of GBS post vaccination should've been weighed to the benefit of having received COVID-19 vaccination. COVID-19 vaccination decreases the probability of becoming infected and decreases hospitalization and mortality [3]. During the recent Delta variant surge, greater than 95% of hospitalized patients were unvaccinated [4]. The risk-benefit ratio becomes more of a dilemma to the general population, when they have experienced an adverse event from immunization. We present the case reports of temporary related GBS to COVID-19 vaccination highlighting the inadequacy of current retrospective reports to urge patients away from obtaining vaccinations.

Case presentation

A 71-year-old Caucasian male with a past medical history of hypertension, hyperlipidemia, atrial fibrillation (status-post ablation), obstructive sleep apnea and obesity, presented to Mayo Clinic, Jacksonville. He also had an episode of Guillain-Barre Syndrome (GBS) temporary related to Influenza vaccination several years ago. All symptoms of GBS had resolved with physiotherapy and the patient had declined the COVID-19 vaccine due to this history of GBS. He was diagnosed with COVID-19 pneumonia in an outside hospital and was subsequently transferred to Mayo Clinic.

His COVID-19 symptom onset was two weeks prior to the hospitalization, and started with cough, fever, and mild diarrhea. Due to his worsening shortness of breath, cough, and fever with chills, he was admitted to a local hospital. A nasopharyngeal polymerase chain reaction done there for SARS-CoV-2 returned positive. He was diagnosed with COVID-19 pneumonia with acute hypoxic respiratory failure and subsequent acute respiratory distress syndrome (ARDS). There, he was treated with oxygen via a high-flow nasal cannula (HFNC), five days of Remdesivir, and dexamethasone 6 mg daily. He

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https://doi.org/10.1016/j.idcr.2022.e01467
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developed a right peroneal deep vein thrombosis (DVT) and received enoxaparin 1 mg/kg BID for the same. After seven days of hospitalization, he was airlifted to Mayo Clinic due to progression of the disease and concerns for cytokine storm and worsening respiratory failure.

On admission to the intensive care unit, his vital signs were as follows: a blood pressure of 147/90 mmHg, a heart rate of 73 beats/minute, a basal metabolic index of 32.8 kg/m2, a respiratory rate of 16/minute, a temperature of 36.9. C and an oxygen saturation of 90% on HFNC 50 liters per minute and 60% FiO2. His laboratory results showed an elevated D-dimer (1613 ng/ml), due to which a computed tomography angiography was ordered which returned negative for pulmonary embolism (PE). He had mild thrombocytosis ($396 * 10^9$ L), a high C-reactive protein (CRP) (73.8 mg/L), lactate dehydrogenase (309 U/L), interleukin-6 (16 pg/ml), ferritin (1430 ng/ml) and procalcitonin (0.142 ng/ml) levels. Chest x-ray was consistent with COVID-19 pneumonia.

He was stabilized on oxygen with HFNC. Remdesivir was extended to a ten-day course, Dexamethasone was increased to 20 mg for 5 days followed by 10 mg for 5 days, and a five-day course of antibiotic treatment for suspected nosocomial pneumonia with Levofloxacin and Zosyn were given for suspected superimposed bacterial pneumonia. Infectious Diseases (ID) and Neurology consultations were obtained to discuss the safety of COVID-19 vaccination. After five days of close monitoring, he was weaned to room air and his oxygen saturation was stable at 92–94%. The patient was discharged after eight days of hospitalization, and his medications included Apixaban, a Dexamethasone taper with regular blood glucose monitoring, and Trimethoprim/Sulfamethoxazole for Pneumocystis carinii pneumonia prophylaxis while on steroid taper. He was advised to receive a mRNA COVID-19 vaccine series in ninety days.

Discussion

Several studies show that unvaccinated patients are at higher risk of getting severe COVID-19 infection than those vaccinated, especially when it comes to elderly population with multiple comorbidities [5]. Our patient feared getting GBS in context of his prior history, more than getting COVID-19 infection. This case highlights the difficulty of weighing the risks and benefits of vaccination especially when a vaccine-related event exists in one's history.

Table 1 shows a PUBMED literature review of reported incidences of GBS after COVID-19 vaccination with various vaccine types given across the world [6–31]. We included CDC and WHO analyses of larger population groups. With these limited data, Vaxzevria/AstraZeneca/Covishield seem to be most temporary related to GBS cases post-vaccination. In the United States, Janssen vaccine, by Johnson & Johnson, has more reported cases of GBS. However, no study has shown a statistically significant increase of GBS after administration of any of these vaccines [32]. A study by Garcia-Grimshaw et al. demonstrates an incidence of 0.18/100,000 of GBS in a large Hispanic cohort within 30 days of receiving the first dose of Pfizer vaccine [33]. Another large-scale study by Shapiro Ben David et al. specifically demonstrated the minimal risk of GBS after vaccination with Pfizer vaccine, in patients with a prior history of GBS [26]. These studies show that Pfizer vaccine imposes only minimal risk of GBS in general population as well as in people with a prior history of GBS. Similarly, only one case of GBS post-vaccination has been reported with Moderna, based on our literature review. Two studies, where GBS was reported with unknown forms of COVID-19 vaccines reported in our table, lack vaccine manufacturer data, and do not add significantly to the results. Hence, we show that case reports and a few studies do report onset of GBS related in a temporal fashion to COVID-19 vaccination. A few studies do show minimal risk of developing GBS post vaccination. No study was a case-matched real-world study directly comparing the incidence of GBS compared to the general population or comparison of one COVID-19 vaccine manufacturer to another. Also, no study determined if an increased risk of GBS post COVID-19 vaccination existed in presence of a prior history, compared to the general population. With these limited data, the education of an individual with a history of GBS hesitant to obtain a COVID-19 immunization must be shared. It should be highlighted to the patients that, although, a few cases of GBS related to COVID-19 vaccination have been reported, no head-to-head study comparing vaccine manufacturers have been done. Moreover, an assessment of their personal risk of acquiring COVID-19 infection should be explained to them. Subsequently, the risk of acquiring a rare complication to COVID-19 vaccination, to their risk of becoming seriously infected by COVID-19 [34] must be carefully established using the value system of the patient.

Table 1
A PUBMED literature review showing number of reported cases of GBS following vaccination with different vaccines [5–31].

Vaccine	Studies	Number of case reports
Vaxzevria/AstraZeneca/ Covishield (ChAdOx1 nCov-19)	McKean N. et al.	1
	Introna A. et al.	1
	Maramattom BV. et al.	7
	Hasan T. et al.	1
	Nasuelli N.A. et al.	1
	Min Y.G. et al.	2
	Allen C.M. et al.	4
	Azam S et al.	1
	Patel S.U. et al.	1
	Bonifacio G.B. et al.	5
	Oo W.M. et al.	3
	WHO	227 (EU/EEA) 150 (others) 14 (Central and South America)
Janssen	Rosenblum H.G. et al.	100
	Prasad A. et al.	1
	Loza A.A.M et al.	1
Pfizer-BioNTech	Waheed S. et al.	1
	Hughes D.L. et al.	1
	Scendoni R. et al.	1
	Trimboli M. et al.	1
	García-Grimshaw M. et al.	7
	Shapiro Ben David S. et al.	1
	Rao S.J. et al.	1
CoronaVac/Sinovac	CoronaVac/Sinovac	1
	Tutar N.K. et al.	1
Moderna	Matarneh A.S. et al.	1
Vaccine Unknown	Razok A. et al.	1
	Finsterer J. et al.	1

In conclusion, Fortunately GBS related to COVID-19 vaccination is a rare event for the general population. For those, as the presented case, with a GBS history, minimal data exists to access if an increased risk of GBS exists or not. The key in managing such patients is educating them on the current likelihood of GBS occurring in the population and assist them in balancing that information with the risk of them having a severe case of COVID-19 infection, if acquired.

Conflict of Interest

Authors declare no Conflict of Interest.

Acknowledgements

None.

References

[1] Israeli E, Agmon-Levin N, Blank M, Chapman J, Shoenfeld Y. Guillain-Barré syndrome–a classical autoimmune disease triggered by infection or vaccination. Clin Rev Allergy Immunol 2012;42(2):121–30. https://doi.org/10.1007/s12016-010-8213-3
[2] Lasky T, Terracciano GJ, Magder L, Koski CL, Ballesteros M, Nash D, et al. The Guillain-Barré syndrome and the 1992–1993 and 1993–1994 influenza vaccines. N Engl J Med 1998;339(25):1797–802. https://doi.org/10.1056/NEJM199812173392501
[3] Vitiello A, Ferrara F, Troiano V, La Porta R. COVID-19 vaccines and decreased transmission of SARS-CoV-2 [published online ahead of print, 2021 Jul 19]. Inflammopharmacology 2021;29:1–4. https://doi.org/10.1007/s10787-021-00847-2
[4] MMWR August 27, 2021/70(34);1150–1155.
[5] Griffin JB, Haddix M, Danza P, Fisher R, Koo TH, Traub E, et al. SARS-CoV-2 infections and hospitalizations among persons aged ≥ 16 years, by vaccination status — Los Angeles County, California, May 1–July 25, 2021. Cent Dis Control Prev 2021;70(34):1170–6. [Weekly/August 27].
[6] McKean N, Chircop C. Guillain-Barré syndrome after COVID-19 vaccination. BMJ Case Rep CP 2021;14:e244125. https://doi.org/10.1136/bcr-2021-244125
[7] Introna A, Caputo F, Santoro C, Guerra T, Ucci M, Mezzapesa DM. Guillain-Barré syndrome after AstraZeneca COVID-19-vaccination: a causal or casual association. Clin Neurol Neurosurg 2021;106887(208):106887. https://doi.org/10.1016/j.clineuro.2021.106887. [ISSN 0303-8467].
[8] Maramattom BV, Krishnan P, Paul R, Padmanabhan S, Nampoothiri SCV, Syed AA, et al. Guillain-Barré Syndrome following ChAdOx1-S/nCoV-19 vaccine. Ann Neurol 2021;90:p312–4. https://doi.org/10.1002/ana.26143
[9] Hasan T, Khan M, Khan F, Hamza G. Case of Guillain-Barré syndrome following COVID-19 vaccine. BMJ Case Rep CP 2021;14:e243629. https://doi.org/10.1136/bcr-2021-243629
[10] Nasuelli NA, De Marchi F, Cecchin M, De Paoli I, Onorato S, Pettinaroli R, et al. A case of acute demyelinating polyradiculoneuropathy with bilateral facial palsy after ChAdOx1 nCoV-19 vaccine. Neurol Sci 2021;42:4747–9. https://doi.org/10.1007/s10072-021-05467-w
[11] Min YG, Ju W, Ha YE, Ban JJ, Lee SA, Sung JJ, et al. Sensory Guillain-Barre syndrome following the ChAdOx1 nCov-19 vaccine: report of two cases and review of literature. J Neuroimmunol 2021;577691(359):577691. https://doi.org/10.1016/j.jneuroim.2021.577691. [ISSN 0165-5728].
[12] Allen CM, Ramsamy S, Tarr AW, Tighe PJ, Irving WL, Tanasescu R, et al. Guillain–Barré Syndrome Variant occurring after SARS-CoV-2 vaccination. Ann Neurol 2021;90:p315–8. https://doi.org/10.1002/ana.26144
[13] Azam S, Khalil A, Taha A. Guillain-Barré Syndrome in a 67-year-old male post COVID-19 vaccination (Astra Zeneca). Am J Med Case Rep 2021;9(8):p424–7. http://pubs.sciepub.com/ajmcr/9/8/10/index.html
[14] Patel SU, Khurram R, Lakhani A, Quirk B. Guillain-Barre syndrome following the first dose of the chimpanzee adenovirus-vectored COVID-19 vaccine, ChAdOx1. BMJ Case Rep CP 2021;14:e242956. https://doi.org/10.1136/bcr-2021-242956
[15] Bonifacio GB, Patel D, Cook S, Purcaru E, Couzins M, Domjan J, et al. Bilateral facial weakness with paraesthesia variant of Guillain-Barré syndrome following Vaxzevria COVID-19 vaccine. J Neurol Neurosurg Psychiatry 2021. https://jnnp.bmj.com/content/early/2021/07/13/jnnp-2021-327027
[16] Oo WM, Giri P, de Souza A. AstraZeneca COVID-19 vaccine and Guillain- Barré Syndrome in Tasmania: a causal link? J Neuroimmunol 2021;577719(360). https://doi.org/10.1016/j.jneuroim.2021.577719. [ISSN 0165-5728].
[17] Statement of the WHO Global Advisory Committee on Vaccine Safety (GACVS) COVID-19 subcommittee on reports of Guillain-Barré Syndrome (GBS) following adenovirus vector COVID-19 vaccines. Statement of the WHO Global Advisory Committee on Vaccine Safety (GACVS) COVID-19 subcommittee on reports of Guillain-Barré Syndrome (GBS) following adenovirus vector COVID-19 vaccines; 2021.
[18] Rosenblum HG, Hadler SC, Moulia D., Shimabukuro TT, Su JR, Tepper NK, et al. Use of COVID-19 vaccines after reports of adverse events among adult recipients of Janssen (Johnson & Johnson) and mRNA COVID-19 vaccines (Pfizer-BioNTech and Moderna): update from the advisory committee on immunization practices — United States, July 2021 | MMWR (cdc.gov), vol. 70(32). CDC; 2021, p. 1094–9.
[19] Prasad A, Hurlburt G, Podury S, Tandon M, Kingree S, Srivastava S. A novel case of bifacial diplegia variant of Guillain-Barré syndrome following Janssen COVID-19 vaccination. Neurol Int 2021;13(3):p404–9. https://doi.org/10.3390/neurolint13030040
[20] Loza AAM, Holroyd KB, Johnson SA, Pilgrim DM, Amato AA. Guillain-Barré syndrome in the placebo and active arms of a COVID-19 vaccine clinical trial: temporal associations do not imply causality. Neurology 2021;96(22):p1052–4 https://n.neurology.org/content/96/22/1052
[21] Waheed S, Bayas A, Hindi F, Rizwi Z, Espinosa PS. Neurological complications of COVID-19: Guillain-Barre Syndrome following pfizer COVID-19 vaccine. Cureus 2021;13(2):e13426 https://www.cureus.com/articles/52295-neurological-complications-of-covid-19-guillain-barre-syndrome-following-pfizer-covid-19-vaccine
[22] Hughes DL, Brunn JA, Jacobs J, Todd PK, Askari FK, Fontana RJ. Guillain-Barré syndrome after COVID-19 mRNA vaccination in a liver transplant recipient with favorable treatment response. Liver Transplant 2021. https://doi.org/10.1002/lt.26279
[23] Scendoni R, Petrelli C, Scaloni G, Logullo FO. Electromyoneurography and laboratory findings in a case of Guillain-Barré Syndrome after second dose of Pfizer COVID-19 vaccine. Hum Vaccin Immunother 2021;17:4093–6. https://doi.org/10.1080/21645515.2021.1954826
[24] Trimboli M, Zoleo P, Arabia G, Gambardella A. Guillain-Barré syndrome following BNT162b2 COVID-19 vaccine. Neurol Sci 2021;42:4401–2. https://doi.org/10.1007/s10072-021-05523-5
[25] García-Grimshaw M, Michel-Chávez A, Vera-Zertuche JM, Galnares-Olalde JA, Hernández-Vanegas LE, Figueroa-Cucurachi M, et al. Guillain-Barré syndrome is infrequent among recipients of the BNT162b2 mRNA COVID-19 vaccine. Clin Immunol 2021;108818(230):108818. https://doi.org/10.1016/j.clim.2021.108818. [ISSN 1521-6616].
[26] Shapiro Ben David S, Potasman I, Rahamim-Cohen D. Rate of recurrent Guillain-Barré Syndrome after mRNA COVID-19 vaccine BNT162b2. JAMA Neurol 2021;78:1409. https://jamanetwork.com/journals/jamaneurology/fullarticle/2783708
[27] Rao SJ, Khurana S, Murthy G, Dawson ET, Jazebi N, Haas CJ. A case of Guillain-Barre syndrome following Pfizer COVID-19 vaccine. J Community Hosp Intern Med Perspect 2021;11(5):597–600. https://doi.org/10.1080/20009666.2021.1954284
[28] Tutar NK, Eyigürbüz T, Yildirim Z, Kale N. A variant of Guillain-Barre syndrome after SARS-CoV-2 vaccination: AMSAN. Ideggyógy Szle 2021;74(07–08):p286–8. https://doi.org/10.18071/isz.74.0286
[29] Razok A, Shams A, Almeer A, Zahid M. Post-COVID-19 vaccine Guillain-Barré syndrome; first reported case from Qatar. Ann Med Surg 2021;102540(67):102540. https://doi.org/10.1016/j.amsu.2021.102540. [ISSN 2049-0801].
[30] Matarneh AS, Al-battah AH, Farooqui K, Ghamoodi M, Alhatou M. COVID-19 vaccine causing Guillain-Barre syndrome, a rare potential side effect. Clin Case Rep 2021;9:e04756. https://doi.org/10.1002/ccr3.4756
[31] Finsterer J. Exacerbating Guillain–Barré Syndrome eight days after vector-based COVID-19 vaccination. Hindawi 2021. https://doi.org/10.1155/2021/3619131
[32] Koike H, Chiba A, Katsuno M. Emerging infection, vaccination, and Guillain–Barré Syndrome: a review. Neurol Ther 2021;10:523–37. https://doi.org/10.1007/s40120-021-00261-4
[33] García-Grimshaw M, Michel-Chávez A, Vera-Zertuche JM, Galnares-Olalde JA, Hernández-Vanegas LE, Figueroa-Cucurachi M, et al. Guillain-Barré syndrome is infrequent among recipients of the BNT162b2 mRNA COVID-19 vaccine. Clin Immunol 2021;230:108818. https://doi.org/10.1016/j.clim.2021.108818
[34] Bertsimas D, et al. PLoS One 2020. [⟨www.bma.org⟩, ⟨www.doh.wa.gov⟩].