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Case Study

# Male in Early Adolescence Presenting with Guillain-Barré Syndrome Following BECOV2D Vaccine

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## Abstract

COVID vaccination has been associated with serious disorders including thrombosis with thrombocytopenia syndrome (TTS), Guillain-Barré syndrome (GBS), and myocarditis. GBS has been reported in adults following COVID-19 infection and rarely following the COVID-19 vaccination. Post COVID vaccination GBS has been associated with prominent and early facial diplegia and quadriplegia. Extension of the COVID vaccination program to the pediatric age group of 5 to 17 years has exposed this population to the adverse effects of the vaccination. Only a few case reports of post-vaccination GBS have been reported in the pediatric age group without any data on the true prevalence. We report a case of a male in his early adolescence with GBS presenting as facial diplegia and rapid quadriplegia following the BECOV2D, (Corbevax) vaccination. Our case is the first case of GBS reported following BECOV2D, (Corbevax) vaccination and highlights the presentation with prominent and early diplegia, which is similar to the presentation in adults.

**More Information**

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## Introduction

The first case of COVID-19 infection was reported in Wuhan in December 2019 followed by the World Health Organization declaring the outbreak a pandemic in March 2020. Subsequently, various vaccines against Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) were rapidly developed and administered globally. The Pfizer-BioNTech and Moderna COVID-19 vaccines were approved in December 2020 followed by the Janssen vaccine in February 2021. The Pfizer and Moderna vaccines are mRNA vaccines, the AstraZeneca-Oxford (Covishield in India), Johnson & Johnson, and Sputnik V are viral vector vaccines, and Covaxin, Sinovac-CoronaVac, and Sinopharm's SARS-CoV-2 Vaccine-Vero Cell are inactivated viral vaccines, BECOV2D or Corbevax is a recombinant protein subunit COVID-19 vaccine developed by Texas children hospital Center for Vaccine Development and Baylor College of Medicine, Houston and Dynavax and has been licensed to Indian pharmaceutical Biological E Limited (BioE) for development and production. The Pfizer-BioNTech COVID-19 vaccine is the only vaccine approved by FDA in the USA for children ages 5 through 17 years. The vaccination drive in India for children in the age group of 15-18 years commenced on January 3, 2022. The drive later expanded on 16 March 2022 to include children aged between 12-14 years. Drug Controller General of India (DCGI) on 26 April 2022 granted emergency use approval to COVID-19 vaccines, Covaxin and Corbevax for use in children under the age group of 12 years. This has exposed the pediatric population to post-vaccination complications as well. Vaccine Adverse Events Reporting System (VAERS), has reported three serious adverse events in association with COVID-19 vaccines. These include Thrombosis with thrombocytopenia syndrome (TTS) [1] which is a rare disorder with venous or arterial thrombosis with thrombocytopenia, Guillain-Barre syndrome (GBS) [2], and myocarditis [3] with myocarditis being the predominant adverse event reported in the pediatric population. WHO has recommended [4] that healthcare professionals should monitor and report all vaccine related adverse events including GBS. Only a few case reports of post-vaccination GBS have been reported in the pediatric age group without any data on the true prevalence.

We report a case of GBS temporally related to the BECOV2D, (Corbevax) a protein subunit vaccine in a male teenager.

## Case presentation

A 13-year-old male with no co-morbidities and no past medical history of any disease was apparently well one day

back when he complained of sudden onset weakness in all four limbs. He said "The disease hit me very rapidly when I was traveling for the national level tennis tournament. I was well one night prior and had my usual session of tennis practice. I was shocked and horrified the next day morning to realize that I could not get up and sit up on my own. I had to miss my tennis match". He was going for his tennis practice the evening prior and woke up the next morning with weakness in all 4 limbs with bilateral severe facial weakness. Motor weakness progressed rapidly by afternoon to a complete inability to move limbs except for minimal movement along gravity with the inability to turn in bed. No sensory symptoms nor sphincter dysfunction was reported. No precedent viral respiratory nor diarrheal illness was reported. He was admitted for further evaluation with a provisional diagnosis of rapidly progressive facial diplegia with quadriplegia. The patient had no other precedent viral illness nor any other vaccination in the previous 3 to 6 weeks prior to the onset of GBS symptoms. The patient had received the first dose of the BECOV2D, (Corbevax) vaccine 20 days prior. Physical examination revealed a House-Brackman grade V bilateral infranuclear seventh cranial nerve palsy (no movement of forehead, incomplete closure of eyes with minimal movement of mouth) with upper and lower limb power of medical research council grade 2/5 with areflexia and flexor plantars. He could count to 37 in a single breath. In view of the abrupt onset of pure motor quadriplegia an urgent serum potassium level was evaluated and found to be normal (4.5 meq/l). Routine hematological and biochemical investigations were within normal limits. MRI brain with the screening of the entire spine did not reveal any significant abnormality. A nerve conduction study on day one of the illness revealed absent F waves with conduction blocks in the bilateral ulnar nerve with attenuated H reflexes (Figure 1A-C) and chronodispersed F waves in the tibial nerve with normal sensory nerve action potentials in upper and lower limbs. Blink reflex was grossly abnormal with barely recordable R1 and R2 responses bilaterally. The patient was managed with a five-day course of intravenous infusion of Immunoglobin (IVIg) in a dose of 0.4 mg/kg. day (weight of child is 48 kg) with a favorable response of plateauing of deficit by the third dose and early improvement of upper limb motor strength after the fifth dose with moderate recovery of motor power by 4 weeks. He was discharged in a stable condition, with no bulbar weakness, and was managed with nerve vitamins, and limb physiotherapy.

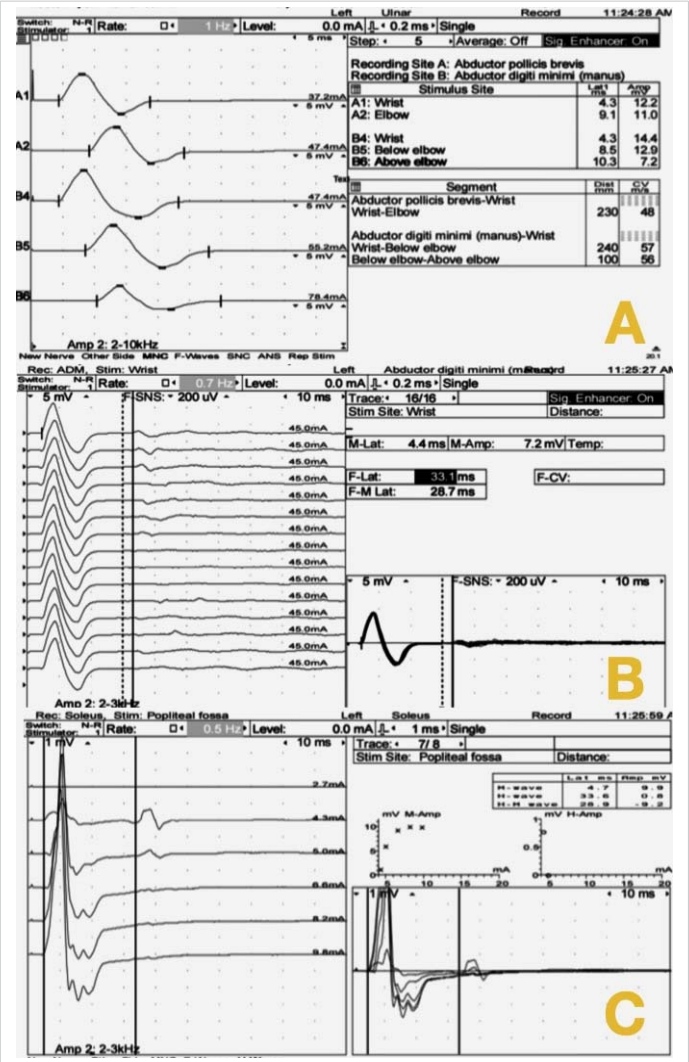


**Figure 1:** Ncv studies revealed A. Conduction bocks in ulnar nerve; B. Impersistence of f-waves in ulnar nerve C. Attenuated H.

## Discussion

Guillain-Barré Syndrome (GBS) is an autoimmune disorder of the peripheral nervous system (PNS) and has been observed following COVID-19 infection or more rarely subsequent to COVID-19 vaccination. GBS has been associated with an inflammatory response due to multiple infections, including campylobacter jejuni, Lyme disease, and other viral infections. Molecular mimicry, anti-ganglioside antibody production, and complement activation contribute to the pathogenesis of GBS. Zhao described the first case of GBS in a patient following SARS-CoV-2 infection [5]. This was followed by multiple case reports and small case series of GBS occurring either during the SARS-CoV-2 infection or within a few weeks of the illness. A systematic review of all published cases included 73 GBS patients [6]. The clinical presentation and electrophysiological subtypes resembled those of classic GBS and variants like Miller Fisher syndrome were also reported. SARS-CoV-2 RNA was absent in the CSF of all tested cases. No clinical or investigative feature differentiated the classical GBS from that of post-COVID GBS except the temporal relation of COVID-19 infection within 4 weeks of the onset of GBS. COVID-19 vaccines, particularly the first dose of adenoviral vector-based vaccines may be associated with GBS. Post COVID-19 vaccination related GBS may have distinctive clinical features characterized by disproportionately frequent and early bilateral facial palsy and severe quadriplegia. The time interval between vaccination and GBS onset varies from 4 to 30 days [7]. With the COVID vaccination drive extending to the pediatric

population it is important to be vigilant to observe whether the pediatric population is equally at risk of developing post-vaccination GBS and whether they share similar characteristics of post COVID GBS seen in adults, especially the prominent and early facial diplegia. Only 2 case reports of post COVID vaccination GBS in the pediatric population have been reported to date. The first report described a 14-year-old male who received the second dose of the Pfizer-BioNTech COVID-19 vaccination 3 weeks prior and presented with bilateral facial weakness and areflexic quadriplegia with a fair response to intravenous immunoglobulin [8]. The second report described a 16-year-old female with sensory predominant Guillain-Barré Syndrome 2 days after receiving the Pfizer-BioNTech COVID-19 vaccine with the stocking-glove distribution of paraesthesia and mild ataxia without any weakness or ophthalmoplegia [9]. To the best of our knowledge, our case is the first case reported following the BECOV2D (Corbevax) vaccine and illustrates the important clinical presentation of early and prominent facial diplegia in post-COVID-19 vaccine-related GBS. A temporal correlation does not necessarily imply, and hence should not be deemed to signify causality. However, it is important to remain vigilant, so that any potential increased risk is properly evaluated. Furthermore, the highly specific and characteristic mode of presentation, with bifacial weakness as the initial symptom, maybe a symptom to be vigilant of in the context of GBS following the recent COVID-19 vaccination [10-15].

## Conclusion

GBS may occur after COVID vaccination in the pediatric age group. The clinical features of early and prominent facial diplegia in GBS favor a post-COVID vaccination etiology even in the pediatric age group. Post-vaccination GBS may occur within 4 to 30 days of the COVID vaccination. Post-vaccination GBS in the pediatric age group has been described with the Pfizer-BioNTech COVID-19 vaccination which is a m-RNA vaccine. However, GBS can occur in the pediatric age group even following Corbevax which is a recombinant protein subunit COVID-19 vaccine.

### Authors' contributions

The submission is based on our original work and had not been published elsewhere in whole or part or is not under consideration of another journal for publication. The manuscript has been read and approved by all the authors. The requirements for authorship as stated have been met, and each author believes that the manuscript represents honest work. Dr Vineet Suri, Dr Kanika Suri, Dr Kunal Suri and Dr Priyal made the draft of the article and were directly involved in its preparation and submission. Dr. Vineet Suri proofread and validated the accuracy of data and article itself. Informed consent was taken.

## References


1. MacNeil JR, Su JR, Broder KR, Guh AY, Gargano JW, Wallace M, Hadler SC, Scobie HM, Blain AE, Moulia D, Daley MF, McNally VV, Romero JR, Talbot HK, Lee GM, Bell BP, Oliver SE. Updated Recommendations from the Advisory Committee on Immunization Practices for Use of the Janssen (Johnson & Johnson) COVID-19 Vaccine After Reports of Thrombosis with Thrombocytopenia Syndrome Among Vaccine Recipients - United States, April 2021. MMWR Morb Mortal Wkly Rep. 2021 Apr 30;70(17):651-656. doi: 10.15585/mwr.mm7017e4. PMID: 33914723; PMCID: PMC8084127.
2. Woo EJ, Mba-Jonas A, Dimova RB, Alimchandani M, Zinderman CE, Nair N. Association of Receipt of the Ad26.COV2.S COVID-19 Vaccine With Presumptive Guillain-Barré Syndrome, February-July 2021. JAMA. 2021 Oct 26;326(16):1606-1613. doi: 10.1001/jama.2021.16496. PMID: 34617967; PMCID: PMC8498927.
3. Salah HM, Mehta JL. COVID-19 Vaccine and Myocarditis. Am J Cardiol. 2021 Oct 15;157:146-148. doi: 10.1016/j.amjcard.2021.07.009. Epub 2021 Jul 12. PMID: 34399967; PMCID: PMC8272967.
4. 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. The statement, 26 July 2021
5. Zhao H, Shen D, Zhou H, Liu J, Chen S. Guillain-Barré syndrome associated with SARS-CoV-2 infection: causality or coincidence? Lancet Neurol. 2020 May;19(5):383-384. doi: 10.1016/S1474-4422(20)30109-5. Epub 2020 Apr 1. PMID: 32246917; PMCID: PMC7176927.
6. Abu-Rumeileh S, Abdelhak A, Foschi M, Tumani H, Otto M. Guillain-Barré syndrome spectrum associated with COVID-19: an up-to-date systematic review of 73 cases. J Neurol. 2021 Apr;268(4):1133-1170. doi: 10.1007/s00415-020-10124-x. Epub 2020 Aug 25. PMID: 32840686; PMCID: PMC7445716.
7. Kim JE, Min YG, Shin JY, Kwon YN, Bae JS, Sung JJ, Hong YH. Guillain-Barré Syndrome and Variants Following COVID-19 Vaccination: Report of 13 Cases. Front Neurol. 2022 Jan 27;12:820723. doi: 10.3389/fneur.2021.820723. PMID: 35153993; PMCID: PMC8833101.
8. Malamud E, Otallah SI, Caress JB, Lapid DJ. Guillain-Barré Syndrome After COVID-19 Vaccination in an Adolescent. Pediatr Neurol. 2022 Jan;126:9-10. doi: 10.1016/j.pediatrneurol.2021.10.003. Epub 2021 Oct 8. Erratum in: Pediatr Neurol. 2021 Dec 10;: PMID: 34717201; PMCID: PMC8498800.
9. Kim Y, Zhu Z, Kochar P, Gavigan P, Kaur D, Kumar A. A Pediatric Case of Sensory Predominant Guillain-Barré Syndrome Following COVID-19 Vaccination. Child Neurol Open. 2022 Jan 25;9:2329048X221074549. doi: 10.1177/2329048X221074549. PMID: 35097156; PMCID: PMC8793378.
10. Keh RYS, Scanlon S, Datta-Nemdharry P, Donegan K, Cavanagh S, Foster M, Skelland D, Palmer J, Machado PM, Keddie S, Carr AS, Lunn MP; BPNS/ABN COVID-19 Vaccine GBS Study Group. COVID-19 vaccination and Guillain-Barré syndrome: analyses using the National Immunoglobulin Database. Brain. 2023 Feb 13;146(2):739-748. doi: 10.1093/brain/awac067. PMID: 35180300; PMCID: PMC8903477.
11. Lee HY, Lien WC. Effects of COVID-19 vaccine type on Guillain-Barré syndrome: Two cases and a literature review. Hum Vaccin Immunother. 2023 Dec 31;19(1):2171231. doi: 10.1080/21645515.2023.2171231. Epub 2023 Feb 22. PMID: 36919452; PMCID: PMC10026858.
12. Woo EJ, Gee J, Marquez P, Baggs J, Abara WE, McNeil MM, Dimova RB, Su JR. Post-authorization safety surveillance of Ad.26.COV2.S vaccine: Reports to the Vaccine Adverse Event Reporting System and v-safe, February 2021-February 2022. Vaccine. 2023 Jul 5;41(30):4422-4430. doi: 10.1016/j.vaccine.2023.06.023. Epub 2023 Jun 14. PMID: 37321898; PMCID: PMC10264169.
13. Mohseni Afshar Z, Sharma A, Babazadeh A, Alizadeh-Khatir A, Sio TT, Taghizadeh Moghadam MA, Tavakolli Pirzaman A, Mojadad A, Hosseinzadeh R, Barary M, Ebrahimpour S. A review of the potential neurological adverse events of COVID-19 vaccines. Acta Neurol Belg. 2023 Feb;123(1):9-44. doi: 10.1007/s13760-022-02137-2. Epub 2022 Nov 16. PMID: 36385246; PMCID: PMC9668235.

14. Abara WE, Gee J, Marquez P, Woo J, Myers TR, DeSantis A, Baumblatt JAG, Woo EJ, Thompson D, Nair N, Su JR, Shimabukuro TT, Shay DK. Reports of Guillain-Barré Syndrome After COVID-19 Vaccination in the United States. JAMA Netw Open. 2023 Feb 1;6(2):e2253845.doi:10.1001/jamanetworkopen.2022.53845.Erratum in: JAMA Netw Open. 2023 May 1;6(5):e2315740. PMID: 36723942; PMCID: PMC9892957.

15. Chalela JA, Andrews C, Bashmakov A, Kapoor N, Snelgrove D. Reports of Guillain-Barre Syndrome Following COVID-19 Vaccination in the USA: An Analysis of the VAERS Database. J Clin Neurol. 2023 Mar;19(2):179-185. doi: 10.3988/jcn.2022.0237. PMID: 36854334; PMCID: PMC9982177.