ASIAN JOURNAL OF PHARMACEUTICAL AND CLINICAL RESEARCH

INNOVARE ACADEMIC SCIENCES
Knowledge to Innovation

Vol 15, Issue 7, 2022

Online - 2455-3891
Print - 0974-2441

Case Report

GUILLAIN-BARRE SYNDROME FOLLOWING CHADOX1 NCOV-19 COVID-19 VACCINATION AT AN ADR MONITORING CENTER IN A TERTIARY CARE HOSPITAL, KOZHIKODE: A CASE SERIES.

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Received: 21 March 2022, Revised and Accepted: 25 April 2022

ABSTRACT

Guillain barre syndrome (GBS) is a rare but fatal autoimmune disease affecting the nervous system. The occurrence of GBS after COVID vaccination is rare and its exact cause is still unknown. Hence, here, we are trying to describe the pattern of GBS following the first dose of COVID-19 vaccination as a case series. The retrospective case series study was carried out by analyzing the serious AEFI (Adverse Events Following Immunization) case notification form reported by health-care professionals to ADR Monitoring Center during the period of March 2021–September 2021.The purpose of these case reports is to ensure proper surveillance methods to monitor the safety of COVID vaccination and to promote further researches which is required to determine the possible link between GBS and COVID-19 vaccination.

Keywords: Guillain barre syndrome, Adverse events following immunization, Covishield vaccine, COVID-19.

 DOI: http://dx.doi.org/10.22159/ajpcr.2022v15i7.44821. Journal homepage: https://innovareacademics.in/journals/index.php/ajpcr

INTRODUCTION

GBS is a serious autoimmune disorder which damages the nerves in the peripheral nervous system causing symptoms such as numbness, tingling, and weakness which gradually progresses to paralysis. The term GBS can be replaced with another term acute inflammatory demyelinating polyneuropathy (AIDP) [1].

Since December 2019, the world has been experiencing a life-changing pandemic caused by the coronavirus disease 2019 (COVID-19). The worldwide focus to prevent COVID-19 is practicing social distancing, contact tracing, travel restrictions, usage of personal protective agents, and mass vaccination program [1]. Vaccines could play an important role in increasing population immunity, preventing severe disease, and reducing mortality [2]. Therefore, global efforts are focusing on the development of safe and efficacious vaccines for COVID-19 prevention, with the implementation of mass vaccination programs.

At present, 10 vaccines are approved for use in India and 14 vaccines are under clinical trials [3]. The Covishield vaccine, manufactured by Serum Institute of India (SII), is the Indian variant of the ChAdOx1 nCoV-19 vaccine (AZD1222) developed by Oxford University and AstraZeneca. It consists of a replication-deficient chimpanzee adenoviral vector ChAdOx1, containing the SARS-CoV-2 structural surface glycoprotein antigen (spike protein; nCoV-19) gene [4]. The reported side effects of Covishield vaccine include pain, itching, swelling, tiredness, headache, chills or fever, joint pain, nausea, muscle pain, allergic reactions, and rarely do we come across cases of GBS [1]. One-third of the patients may develop respiratory failure which requires intensive care admission and mechanical ventilation [1]. In 3–5% of patients, GBS is fatal and in 2/3rd, it may cause disability [5]. The slight increase in the incidence of GBS following vaccination was noted in 1976 [6]. The increased incidence of cases of GBS was first reported following the flu vaccination against influenza A/H1N1 antigen [7].

There are a few reported cases that document a link between ChAdOx1 n COv-19 coronavirus vaccine (Recombinant) and GBS. Even though some cases are self-resolving, attention should be given to such adverse events following immunization as mild cases can progress to severe cases which need ICU admissions and leading to fatal conditions and prolonged hospital stay [5,8]. Intravenous administration of immunoglobulin is the mainstay of treatment. Hence, monitoring of vaccine safety after licensure relies on a combination of passive and active surveillance [9]. Here, we report six cases where the patients developed GBS after the first dose of ChAdOx1 nCoV-19 vaccination.

CASE REPORTS

Case 1

A 61-year-old female patient, with history of Type 2 diabetes mellitus, presented with low grade fever and loose stools for 2 weeks after the first dose of Covishield vaccine. She developed paresthesia of limbs after 17 days of vaccination which worsened over time. She had a fall and sustained head injury and was admitted to the neurology department of a peripheral hospital. CT brain showed traumatic subarachnoid hemorrhage and acute traumatic extradural hematoma. She developed breathlessness and ascending limb weakness with quadriparesis, bulbar, and facial palsy. CSF analysis showed mild albumin-cytological dissociation. Nerve conduction study showed features of severe sensory motor peripheral neuropathy and a diagnosis of AIDP/GBS was made. She was administered intravenous immunoglobulin (IVIG) 2 g/kg daily for 5 days duration along with physiotherapy and other supportive measures. At the time of discharge, the patient was conscious, oriented, and had quadriparesis with predominant lower limb weakness and was able to walk with minimal support.

Case 2

A 64-year-old female patient with a history of Type 2 diabetes mellitus, coronary artery disease, systemic hypertension, and bronchial asthma had two episodes of vomiting after the first dose of Covishield vaccination. She developed low back pain, numbness, and pain in both lower limbs after 6 days of vaccination. The patient was admitted in the neurology department of a peripheral hospital. Clinical examination showed areflexic flaccid quadriparesis. Her nerve conduction study showed severe sensory motor neuropathy and features of AIDP/GBS. She was treated with IVIG 20 g daily for 5 days duration along with antibiotics, DVT prophylaxis, and other supportive measures. In view of the respiratory paralysis, she was intubated and ventilated. Patient deteriorated more and developed asystole. Three cycles of CPR was given, but there was no return of spontaneous circulation and she succumbed to her illness.

Case 3

A 49-year-old male patient with no comorbidities had low grade fever for 2 days after the first dose of Covishield vaccination. After 2 weeks of vaccination, he experienced weakness in his legs while getting up from the motor bike and fell down. He was admitted to the Department of Neurology, Government Medical College (GMC) – Kozhikode. He was not able to stand on his own from sitting position and was able to walk only with support. On examination, the patient was conscious and oriented but he had bilateral lower limb and upper limb weakness, and numbness in both hands and later developed bilateral facial paralysis with bulbar symptoms. Nerve conduction study showed severe sensory motor neuropathy and diagnosis of AIDP/GBS was made. Power of the proximal end of upper limb was 4/5, in distal end, the grip was <50%. Below both the knees, the power was found to be 3/5; power of the hip was 2/5. The compound muscle action potential (CMAP) was reduced in the right ulna and bilateral peroneals. He was given IVIG 20 g once daily for 5 days duration along with Gabapentin 100 mg, DVT prophylaxis, and other supportive measures. At the time of discharge, the patient was conscious, oriented, and had quadriplegia with predominant lower limb weakness.

Case 4

A 31-year-old male patient without any comorbidity had low-grade fever for 1 day and subsided on its own after the first dose of vaccination. Patient developed paresthesia on limbs after 12 days of vaccination which worsened over time and was admitted to the Department of Neurology, GMC – Kozhikode. On the 17th day post- vaccination, the patient developed quadriplegia with bulbar palsy and bilateral facial palsy, respiratory, and neck weakness. Hence, he was intubated and was on mechanical ventilation. Power grade on upper and lower limb was 1/5 which gradually reduced to 0/5. Nerve conduction study showed that features of severe sensory motor peripheral neuropathy and diagnosis of acute inflammatory demyelinating polyneuropathy/ Guillain-Barre were made. Patient was treated with IVIG 0.4gm/kg/day for 5 days with no significant improvement. BP was found to be 160/100, SPO2 85%, and pulse rate 58. As the patient was not improving, two additional doses of IVIG 20 g were given within a gap of 10 days. The condition of the patient improved at the time of discharge.

Case 5

A 66-year-old male with Type 2 diabetes mellitus and systemic hypertension was on irregular medications. He had complaints of numbness in both hands and below the knees and was associated with proximal muscle weakness, sensory symptoms, and autonomic involvement, 6 days after taking the first dose of Covishield vaccine and was admitted to the Department of Neurology GMC – Kozhikode. His nerve conduction study was suggestive of severe sensorimotor peripheral neuropathy involving lower and upper limb predominantly demyelinating type, which was further diagnosed as GBS. Power grade on upper and lower limb was found to be 3/5. Autonomic instability was positive. Patient was treated with IVIG 20 g/day for 5 days. At the time of discharge, the patient was conscious, oriented, had quadriparesis with predominant lower limb weakness, and was able to walk with minimal support.

Case 6

A 60-year old male patient with a history of chronic obstructive pulmonary disease developed upper and lower limb weakness after 14 days of first dose of Covishield vaccine and was admitted to the Department of Neurology, GMC – Kozhikode. His bilateral numbness was gradually progressing from distal to proximal end of upper limb. On examination, the patient was conscious and oriented. Gradually, the patient developed bilateral facial palsy and left palatal palsy. Weakness in the proximal end of both upper and lower limbs was greater than distal end. The power of the proximal end of the upper limb was 3/5 and the distal end was 4/5. Autonomic instability was also found to be positive. Nerve conduction study showed axonal predominant sensorimotor neuropathy suggestive of GBS. Patient was treated with IVIG 20 g/day for 5 days. The quadriparesis on the upper and lower limb was persisting after 5 days of treatment with IVIG (Table 1).

Table 1: Clinical summary of the cases

	Age	Sex	Co morbidities	Clinical features/Associated symptoms	Time from vaccination to the onset of symptoms	Treatment given	Outcome
Case 1	61	F	Type 2 DM	Breathlessness, ascending limb weakness with quadriparesis, bulbar and facial palsy / Low-grade fever, and loose stools.	17 days	IVIG Transfusion along with physiotherapy and other supportive measures.	Quadriparesis at the time of discharge.
Case 2	64	F	Type 2 DM, Systemic hypertension, Coronary Artery disease, Bronchial asthma	Areflexic flaccid quadriparesis with severe sensory and motor neuropathy /Low back pain, numbness, and pain in both limbs	6 days	IVIG Transfusion, Antibiotics, DVT prophylaxis, and other supportive measures	Death
Case 3	49	M	-	Bilateral lower limb and upper limb weakness, and numbness in both hands and later developed bilateral facial paralysis with bulbar symptoms / Low-grade fever	14 days	IVIG, Gabapentin, DVT Prophylaxis and other supportive measures	Quadriplegia with predominant lower limb weakness.
Case 4	31	M	-	Paresthesia on limbs, quadriplegia with bulbar palsy and bilateral facial palsy, respiratory, and neck weakness	17 Days	IVIG Transfusion, DVT prophylaxis and other supportive measures	Improvement in the symptoms
Case 5	66	M	Type 2 DM, Systemic hypertension	Proximal muscle weakness, sensory symptoms, and autonomic involvement/ numbness in both hands and below the knees.	6 Days	IVIG Transfusion, Gabapentin, DVT prophylaxis, and other supportive measures	Quadriparesis with predominant lower limb weakness and was able to walk with minimal support.
Case 6	60	M	Chronic Obstructive Pulmonary Disease (COPD)	Upper and lower limb weakness	14 Days	IVIG Transfusion, DVT prophylaxis, and other supportive measures	Quadriparesis at the time of discharge

DISCUSSION

Out of the six cases, four were male patients and two were females. Four patients aged above 60 years had comorbidities such as diabetes, hypertension, and asthma. The onset of illness was with a latency of 6–17 day post-vaccination with the first dose of Covishield. GBS can occur as a complication of COVID-19 infection too [10]. However, none of these patients had any history of recent infections including COVID-19 or history of other vaccinations. The diagnosis of GBS was made by clinical examinations and nerve conduction studies. IVIG was administered in all the patients and one patient needed two additional doses of IVIG. Among the six cases, only one patient succumbed to the illness and others had a favorable course in the hospital and the symptoms improved at the time of discharge.

Massive vaccination programs are carried out worldwide to lower the disease burden of the SARS-CoV-2 virus pandemic. A possible association of GBS after these vaccines across the world is described in much of the published literature [11-13]. Since the COVID-19 vaccines provide immunity against SARS-CoV-2 spike proteins, these proteins can bind to sialic acid–containing glycoprotein and gangliosides on cell surfaces and an antibody cross-reaction can occur. This may be the reason for an association between GBS and immunization to SARS-CoV-2 [14]. The vector used in ChAdOx1 nCoV-19 vaccine, that is, Simian adenovirus may also trigger the GBS [11]. The literature shows that the annual incidence of GBS cases associated with vaccination is lower (0.81–1.89 cases/100,000 persons) than non-vaccinated patients [13**]**. Clinical trials have shown that COVID vaccines provide 90% efficacy against symptomatic disease and these are projected to prevent at least 60% of infections and around 50% of deaths in a year [15].

CONCLUSION

Monitoring safety and efficacy related to COVID vaccination remain a challenge to the public health sector. Systems for spontaneous reporting of AEFI following COVID vaccination are very inefficient, which leads to underestimation of the disease burdens on the society. Although GBS is a rare side effect of COVID vaccination; the data regarding the annual incidence of such cases worldwide if made available it may provide more systemic and robust surveillance methods to monitor safety profile and impact of COVID vaccination. Therefore, more research is needed to develop low cost investigations and algorithms for prediction of adverse effects of vaccination.

The present study had certain limitations. The period of study was not sufficient to assess more cases related to COVID vaccination. The study was conducted at only one ADR Monitoring Center attached to the GMC – Kozhikode.

ACKNOWLEDGMENTS

The authors acknowledge the active support of the Department of Neurology, Government Medical College – Kozhikode. We extend our thanks to the IPC and Pharmacovigilance Programme of India, Ghaziabad, for encouraging and permitting the publication.

AUTHORS CONTRIBUTION

All the authors have equally contributed to the article and revised the same critically for important intellectual content. All authors approved the final version.

CONFLICTS OF INTERESTS

No potential conflicts of interests were disclosed.

AUTHORS FUNDING

The authors received no specific funding for this work.

ETHICAL APPROVAL

Ethical approval was obtained from Institutional Research Committee and Institutional Ethics Committee of GMC – Kozhikode.

REFERENCES

1. Nguyen TP, Taylor RS. Guillain Barre Syndrome. Treasure Island: StatPearls; 2022.
2. Mer RJ, Kakasaniya GG, Acharya TA, Mehta DS. A participant centred surveillance of adverse events following coronavirus disease immunization phase 1 at a tertiary care teaching hospital. Natl J Physiol Pharm Pharmacol 2022;12:312-6.
3. India-COVID19 Vaccine Tracker. Available from: https://covid19.trackvaccines.org/country/india [Last accessed on 2021 Nov 11].
4. Voysey M, Clemens SA, Madhi SA, Weckx LY, Folegatti PM, Aley PK, *et al*. Safety and efficacy of the ChAdOx1 nCoV-19 vaccine (AZD1222) against SARS-CoV-2: An interim analysis of four randomized controlled trials in Brazil, South Africa, and the UK. Lancet 2021;397:99-111. doi: 10.1016/S0140-6736(20)32661-1, PMID 33306989.
5. 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 2021;14:e242956.
6. Neustadt RE, Fineberg HV. The Swine Flu Affair: Decision-Making on a Slippery Disease. Washington, DC: National Academies Press; 1978.
7. Perez-Vilar S, Hu M, Weintraub E, Arya D, Lufkin B, Myers T, *et al*. Season. J Infect Dis 2020;223:416-25.
8. Zhao H, Shen D, Zhou H, Liu J, Chen S. Guillain-Barré syndrome associated with SARS-CoV-2 infection: Causality or coincidence? Lancet Neuro 2020;19:383-4. doi: 10.1016/S1474-4422(20)30109-5, PMID 32246917
9. Chandler RE. Optimizing safety surveillance for COVID-19 vaccines. Nat Rev Immunol 2020;20:451-2. doi: 10.1038/s41577-020-0372-8, PMID 32555401.
10. Zuberbühler P, Conti ME, León-Cejas L, Maximiliano-González F, Bonardo P, Miquelini A, *et al*. Guillain-Barre syndrome associated to COVID-19 infection: A review of published case reports. Rev Neurol 2021;72:203-12. doi: 10.33588/rn.7206.2020487, PMID 33710610
11. James J, Jose J, Gafoor VA, Smita B, Balaram N. Guillain-Barré syndrome following ChAdOx1 nCoV-19 COVID-19 vaccination: A case series. Neurol Clin Neurosci 2021;9:402-5. doi: 10.1111/ncn3.12537, PMID 34548920
12. 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;359:577691. doi: 10.1016/j.jneuroim.2021.577691, PMID 34416410
13. López-Hernández J, Lisette BR, Adib Jde S, Eunice MJ, Elizabeth LM, Erika GL, *et al*. Guillain-Barré syndrome following SARS-CoV-2 vaccination: Is there a real association? Neuroimmunol Rep 2022;2:100050.
14. Introna A, Caputo F, Santoro C, Guerra T, Ucci M, Mezzapesa DM, *et al*. Guillain-Barré syndrome after AstraZeneca COVID-19-vaccination: A causal or casual association? Clin Neurol Neurosurg 2021;208:106887. doi: 10.1016/j.clineuro.2021.106887, PMID 34418708
15. Swan DA, Bracis C, Janes H, Moore M, Matrajt L, Reeves DB, *et al*. COVID-19 vaccines that reduce symptoms but do not block infection need higher coverage and faster rollout to achieve population impact. Sci Rep 2021;11:15531. doi: 10.1038/s41598-021-94719-y, PMID 34330945