

Case Report

Guillain-Barré syndrome associated with COVID-19 vaccination: a case report

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ABSTRACT

Several reports and studies are being conducted to this day based on the safety profile of COVID-19 vaccines. COVID-19 vaccination inducing GBS is a rare adverse effect and is likely to be causal. Though, there are reports concerning the relation between coronavirus infections and GBS, the pathogenic mechanism and relevant factors behind COVID-19 vaccines inducing GBS are still not being corroborated so far. Guillain-Barre syndrome is the principal cause of acute flaccid paralysis with a prevalence rate of 2 in 100,000 people per year. We illustrate a 55 years old female patient who presented with acute onset paraesthesia and progressive weakness of bilateral lower limbs and gait imbalance of 5 days duration to the Hospital during the first week of September. Her symptoms occurred within 2 weeks of the first dose of the ChAdOx1-n-CoV-19 (Covishield) vaccine proving a major possibility of vaccine-induced neurological adverse effect as she didn't have any likely significant history of illness or allergies in the past rather than type 2 diabetes mellitus. This report aims to highlight the incidence and to ruminate upon this matter while evaluating any GBS cases in the current eras of the COVID-19 pandemic and vaccination programs.

Keywords: Guillain-Barre syndrome, COVID-19 vaccine, AIDP, ChAdOx1-n-CoV-19, Covishield

INTRODUCTION

Since the arrival of the COVID-19 vaccines, many adverse reactions and events related to it have been reported periodically. GBS is an autoimmune disorder in which an immune system produces an immune response to an infection that cross-reacts with the peripheral nerves in a way that ultimately damages the myelin sheath of the nerve fibers, and in some severe cases the axon itself.¹⁻³ However, the definite antigen responsible for this disease remains unknown. There are mainly three forms of GBS—namely AIDP (acute inflammatory demyelinating polyradiculopathy), AMAN (acute motor axonal neuropathy), and AMSAN (acute motor and sensory axonal neuropathy). AIDP sub-type of GBS primarily affects the myelin sheath of the nerve fibers.

COVID-19 vaccines were introduced in various countries around the globe to provide safeguard against the disease by developing an immune response to the SARS-Cov-2 virus. ChAdOx1-n-CoV-19 (Covishield), an Oxford-AstraZeneca vaccine is locally manufactured by the Serum institute of India. It is a viral vector-based vaccine produced from a weakened version of the common cold virus adenovirus from Chimpanzees (ChAdOx1).⁴ Several case reports of onset or relapse of symptoms of demyelination post-vaccination have raised concerns that vaccines could trigger or aggravate GBS, Multiple sclerosis, Optic neuritis other demyelinating, and CNS disorders. In this particular study, we depict a 55 years old female patient with the AIDP subtype of Guillain Barré syndrome 2 weeks after the first dose of ChAdOx1-n-CoV-19 (Covishield) vaccine.

CASE REPORT

A 55-year-old woman, with a medical history of type II diabetes mellitus presented to the emergency department with complaints of acute onset paraesthesia and progressive weakness of lower limb and gait imbalance over 5 days. Her preceding functional status was excellent and she had no history of trauma, weight loss, fever, urinary or bowel incontinence, respiratory or gastrointestinal tract illness. Moreover, she was never tested positive for COVID-19 since the outburst of the COVID-19 pandemic.

She received her first dose of the ChAdOx1-n-CoV-19 (Covishield) vaccine 2 weeks prior to hospital admission and reported with fever (measured body temperature of 37.8°C), headache, body aches and numbness, and sore throat during the first 3 days after receiving the covid vaccination (Figure 1).



Figure 1: Vaccination record of the patient.

During the second week, she developed backache and gradual weakness of bilateral lower limb and gait impairment to the point where she required the support of two people for ambulation. She had even severe pain in the posterior aspects of bilateral lower limbs. On the 5th day of the following week, she was taken to a nearby hospital where she was treated conservatively and later referred to this hospital for neurological evaluation and further management. On physical examination, she was afebrile, vitals were stable, apart from a blood pressure reading of 180/100 mmHg and a pulse rate of 106 beats/min and with normal forced vital capacity and abdominal examination. Her Glasgow coma score was 15/15. Neurological examination revealed areflexic flaccid paraplegia of both lower limbs- proximal more than distal muscle groups (Table 1). Blood test, renal, hepatic, and peripheral smear reports were found to be normal. C-reactive protein was raised at 29 and ESR level at 52. Chest X-ray established clear lungs and pleural spaces proving negative for pneumonia and RT-PCR

(real time polymerase chain reaction) assessment for SARS-Cov-2 was found to be negative too.

Table 1: Muscle scale grades on admission with Oxford Medical Research Council (MRC) criteria.

Motor function	Left	Right
Shoulder abduction	4	5
Shoulder extension	4	5
Elbow extension	4	5
Elbow flexion	4	5
Wrist extension	4	5
Wrist flexion	4	5
Hip flexion	2	2
Hip extension	2	2
Knee flexion	2	2
Knee extension	2	2
Extensor hallucis longus	3	3
Ankle dorsi flexion	3	3
Ankle plantar flexion	2	2

A 12 lead ECG showed normal sinus rhythm. Antibody panel for autoimmune diseases, ANA, and Anti ds DNA were negative. LDH, vitamin d3 measurements were within the normal limits. Nerve conduction study (NCS) confirmed AIDP with sensory motor demyelinating polyradiculopathy of upper limbs and secondary axonopathy of lower limbs (Table 2-5). A Lumbar puncture was performed and cerebrospinal fluid analysis marked albuminocytologic dissociation- elevated protein at 156 (15-45 mg/dl), and WBC of 6 (0-5) consistent with the diagnosis of GBS. MRI whole spine with gadolinium contrast scan to rule out the possibility of spinal pathologies came out to be unremarkable (Figure 2).



Figure 2: MRI whole spine with contrast of the patient showing dilatation of D3-D12 vertebral level representing Hydromyelia. Scoliosis with convexity towards left side at cervico-thoracic level.

All of the above results, including the clinical picture, CSF analysis, and nerve conduction study features accounted for the diagnostic confirmation of AIDP sub-type of GBS.

Table 2: Motor nerve conduction study.

Nerve / sites	Latency ms	Amp. P-P mV	Dur ms	Distance mm	Velocity m/s
R Median-APB					
Wrist	6.58	5.1	17.06	260	36
Elbow	13.75	4.9	18.42	100	42
A. elbow	16.10	4.8	19.69	-	-
L Median-APB					
Wrist	6.44	5.5	19.04	260	44
Elbow	12.35	4.6	20.21	100	59
A. elbow	14.04	4.6	21.44	-	-
R Ulnar-ADM					
Wrist	5.67	2.3	17.67	-	-
B. elbow	11.83	1.3	18.42	265	43
A. elbow	13.75	1.2	18.79	100	52
L Ulnar-ADM					
Wrist	5.56	2.3	16.73	-	-
B. elbow	11.38	1.9	17.38	265	46
A. elbow	13.08	1.8	18.40	100	59
R Peroneal-EDB					
Ankle	Absent				
L Peroneal- EDB					
Ankle	Absent				
R Tibial-AH					
Ankle	Absent				
L Tibial-AH					
Ankle	Absent				
R Tibial-GA					
Pop. Fossa	8.98	4.8	24.15	-	-
L Tibial-GA					
Pop. Fossa	8.50	2.1	22.10	-	-
R Peroneal-Tib Ant.					
Fib Head	4.79	3.2	29.48	-	-
Pop fossa	5.83	3.0	30.08	-	-
L Peroneal-Tib Ant					
Fib Head	5.52	3.4	25.60	-	-
Pop fossa	6.52	3.1	26.96	-	-

Table 3: Sensory nerve conduction study.

Nerve /sites	Onset Lat ms	Peak Lat ms	PP Amp μ V	Distance mm	Velocity m/s
R Median-Dig II (antidromic)					
Wrist	3.31	4.50	5.5	-	-
L Median-Dig II (antidromic)					
Wrist	4.19	5.25	8.8	-	-
R Ulnar-Dig V (antidromic)					
Wrist	1.42	2.38	15.3	-	-
L Ulnar-Dig V (antidromic)					
Wrist	2.63	3.21	11.0	-	-
R Sural-(antidromic)					
Calf	Absent				
L Sural-(antidromic)					
Calf	Absent				

She was admitted to neuro ICU for SBC (single breath count) monitoring for every 6 hours. She was treated with intravenous immunoglobulin (IVIg) at a dose of 2 g/kg in total and 0.4 mg/kg/day for 5 days. She abided the IVIg without any adverse effects. Her SBC was 19 and was closely monitored for respiratory failure, and since, she responded well and remained stable to the IVIg therapy; she was further shifted out of neuro ICU after 8 days where her physiotherapy was continued.

On follow-up, the patient is slowly recovering neurologically after 5 days of IVIg treatment without requiring plasma exchange or any mechanical ventilation support. Physical and occupational therapy was advised for 2 months duration. Her limb motor strength grade on examination of her first follow-up was 4/5 for bilateral upper limbs, 1/5 for left and 2/5 for right lower limb. At present, she is still under observation at home and is

under regular assessments and follow-ups at the Neurology outpatient department.

Table 4: H reflex.

Nerve	H latency
	ms
L Tibial-Soleus	Absent
R Tibial-Soleus	Absent

Table 5: F wave.

Nerve	F min
	ms
R Median-APB	41.8
R Ulnar-ADM	39.1
L Median-APB	37.3
L Ulnar-ADM	39.5
R Peroneal-EDB	Absent
R Tibial-AH	Absent
L Peroneal-EDB	Absent
L Tibial-AH	Absent

DISCUSSION

We have come across numerous reports and studies being published correlating to the COVID-19 vaccine and other vaccines associated with GBS and other neurological diseases. Waheed et al depicted the first case of GBS after the first dose of Pfizer- BioNTech COVID-19 vaccine in February 2021 in the USA in an 82 years old female with gait imbalance, overall body weakness, and paraesthesia of both lower limbs.⁵

Typically, Guillain-Barre syndrome is an inflammatory autoimmune disorder characterized by an acute sensory motor polyradiculopathy that generally initiates with distal paraesthesia preceded by the weakness of the upper and lower limbs.^{2,5} It is the principal cause of acute flaccid paralysis.² It is principally triggered by certain gastrointestinal and respiratory infections caused by viruses such as the *Zika virus*, *Hepatitis E virus*, *Epstein Barr virus*, *Cytomegalovirus* and bacteria's like; *Mycoplasma pneumonia*, *Haemophilus influenzae*, and *Campylobacter jejuni*. 1 in 1000 people is less likely to get GBS due to these infections.²

In this report, we illustrated a female patient of age 55 yrs, who acquired GBS clinical manifestations within 15 days of the Covishield vaccine during mid- August and the first week of September. She had symptoms of acute onset paraesthesia and progressive weakness of the lower limb and ataxic gait of 5 days duration. Patients who have a briskly progressive weakness of both lower limbs/ upper limbs/all limbs that can be asymmetrical or predominantly proximal or distal with no CNS involvement or any probable causes are considered to be likely as GBS.⁶ The cerebrospinal fluid analysis, clinical picture, and Nerve conduction study relatively proved out

to be AIDP sub-type of GBS with level 1 diagnostic certainty according to Brighton case definitions for GBS. On causality assessment, the adverse reaction score was 3 (possible) on the Naranjo scale and a score of 5 (severe) on Hartwig's severity score.

As the only new potential trigger in her medical history was a recent first dose ChAdOx1-n-CoV-19 (Covishield) vaccine and subsequently it is well stated that GBS can occur a few weeks post jab in general, we consider that there is a rational possibility that ChAdOx1-n-CoV-19 (Covishield) vaccine was the likely cause for the development of AIDP sub-type of GBS in this particular case. Besides, in a study conducted by Gondim et al it has been proposed that abrupt improvement only begins after the first 4 weeks duration in 40% of patients who undertake IVIg or plasma exchange standardized treatment.⁷ In a previous study done by Boby et al in the mid-march to mid April 2021, 7 cases of GBS were reported related to the first dose of ChAdOx1-S vaccine (Covishield/AstraZeneca/Vaxzevria) of which, 1 was male and 6 were females and all of them belonged to the age category of 40-70 years.

All of the 7 patients had bilateral facial paresis and progressed to areflexic quadriplegia after the IVIg treatment. In addition, 6 of them needed mechanical ventilation for respiratory collapse and 4 patients evolved with 6th nerve palsy (abducens palsy) and trigeminal sensory nerve involvement.⁸ Patel et al reported a 37-year-old male patient with distal paraesthesia of upper and lower limbs and recurrent backache 2 weeks following the first dose of Chimpanzee adenovirus vectored ChAdOx1 COVID-19 vaccine.⁹

CONCLUSION

This case study was stated to create awareness among healthcare professionals and other individuals regarding the possibilities of COVID-19 vaccines being linked to autoimmune disorders like GBS. There have been few reports published lately related to this statement to support this correlation but the pathogenic mechanism and relevant factors behind COVID-19 vaccines inducing GBS still remains unclear. Although these adverse effects seem less likely to occur in individuals receiving COVID-19 vaccine jab, being able to foresee the severity of GBS variants, it should be taken into consideration. COVID-19 vaccines are possibly linked with the development of GBS but we commend more studies to be conducted and reports as such to be reported in the near future to ascertain this theory. Conversely, we do agree that the benefits of the vaccination prevail over any possible risks or adverse effects of the COVID-19 vaccine and is considered to be less when put into comparison.

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REFERENCES

1. Seven cases of neuro disorder among Covishield recipients. Available at: <https://www.deccanherald.com/national/kerala-doctors-find-7-cases-of-rare-neuro-disorder-among-covishield-recipients-1001092.html>. Assessed on 28 September 2021.
2. Hasan T. Case of Guillain- Barré syndrome following COVID-19 vaccine. *BMJ Case Rep.* 2021;14:1-4.
3. Guillain-Barré Syndrome. Available at: <https://rarediseases.org/rare-diseases/guillain-barre-syndrome/>. Assessed on 28 September 2021.
4. Covid vaccine: India drones deliver Covid jabs to remote areas. *BBC News.* Available at: <https://www.bbc.com/news/world-asia-india-56345591>. Assessed on 29 September 2021.
5. Waheed S. Neurological Complications of COVID-19: Guillain- Barre Syndrome Following Pfizer COVID-19 Vaccine. *Cureus.* 2021;13(2):1-4.
6. Neurological Disorders – adverse events associated with childhood vaccines. *ncbi bookshelf.* Available at: <https://www.ncbi.nlm.nih.gov/books/NBK236298/>. Assessed on 1 October 2021.
7. Leonhard SE, Mandarakas MR, Gondim FAA. Diagnosis and management of Guillain- Barré syndrome in ten steps. *Nat Rev Neurol.* 2019;15:671-83.
8. Maramattom BV, Krishnan P, Paul R. Guillain-Barré Syndrome following ChAdOx1-S/nCoV-19 Vaccine. *Ann Neurol.* 2021;90:312-4.
9. Patel SU. Guillain-Barre syndrome following the first dose of the chimpanzee adenovirus-vectored COVID-19 vaccine, ChAdOx1. *BMJ Case Rep.* 2021;14:1-5.
10. Zito A, Alfonso E, Franciotta D. COVID-19 and Guillain- Barré Syndrome: a case report and review of literature. *Front Neurol.* 2020;11:1-6.

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