

## A Case Report on Post Covid -19 Vaccine Associated Guillain–Barré Syndrome

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### ABSTRACT

Guillain–Barré syndrome (GBS) is an autoimmune demyelinating illness in which a patient's immune system attacks and cause deterioration of peripheral nervous system leading to progressive paralysis and polyneuropathy. The exact cause of the GBS is unclear but the main mechanism of behind is the demyelination of nerves especially the motor, sensory, and autonomic nerves which can be triggered by any immunologic or infectious agent. The infectious agent elicits the humoral and cellular mediated immune response due to their molecular mimicry in which the antibodies created against the infection matches with the proteins on the nerve. The characteristic features of Guillain–Barré syndrome are ascending flaccid paralysis, paresthesia, impairment of muscle reflexes, respiratory failure etc. The GBS is diagnosed via nerve conduction studies, lumbar puncture (Cerebrospinal fluid analysis), electromyography, Brighton criteria. Treatments like intravenous immunoglobulin therapy, plasma exchange can ease the symptoms and reduce the duration of the illness. This case report focusing on a 43-year-old female patient admitted seeking ventilatory support for respiratory distress caused by Guillain–Barré Syndrome in a tertiary hospital. Patient had developed limb weakness with ascending paralysis along with facial weakness within a couple of weeks after receiving the COVID -19 vaccination (COVISHIELD) one month back. Patient underwent nerve conduction study and routine monitoring of vital parameters. After conservative management with physiotherapy, ventilation, intravenous immunoglobulins and prophylaxis for pain and DVT patient gradually started improving the muscle power and was discharged to continue the rehabilitation care at home.

*Keywords: COVID -19, Demyelination, Guillain–Barré syndrome (GBS), Vaccination.*

### 1. INTRODUCTION

During the coronavirus disease 19 (COVID-19) pandemic, vaccinations were developed and deployed at an unprecedented rate and scale. The use of vaccine in Various countries resulted in decline in COVID-19 infections, spreading, length of hospital stays and death rate from randomized clinical trials and worldwide research studies [1]. During clinical trials rare adverse events developed [2]. Among the adverse events hemorrhagic stroke, Meningitis, Encephalitis and GBS have been reported and exact mechanism is not clearly understood. [10]. Guillain–Barré syndrome (GBS) is a heterogeneous dysfunction, self-limited, immune mediated acute paralytic polyneuropathy involving sensory, motor and autonomic nerves [1]. Miller Fisher Syndrome (MFS), Acute Inflammatory Demyelinating Polyneuropathy (AIDP), Acute Motor Axonal Neuropathy (AMAN), and Acute Motor and Sensory Axonal Neuropathy (AMSAN) are the several clinical forms of GBS based on the nerve fibres implicated [3]. Guillain–Barré syndrome (GBS), an immune-related polyradiculoneuropathy with a 5% mortality rate, occurs in 0.81-1.91 cases per 100,000 people -years around the world [4]. Guillain-

Barre syndrome (GBS) has been linked to a variety of infectious agents, including Campylobacter jejuni, Epstein Barr virus, Cytomegalovirus, Zika and has been recorded following COVID-19, polio, hepatitis B, rabies, and influenza vaccinations [5]. The classic symptoms of the disease are ascending flaccid paralysis which is symmetrical in nature, paresthesia's, hyporeflexia or areflexia numbness, dysphagia, facial weakness, bowel and bladder dysfunction etc. Later on, leads to respiratory failure, cardiac arrhythmia, paroxysmal hypertension in severe cases [6]. Molecular mimicry has become widely accepted as the underlying pathophysiology in which the antibodies created by B cell against the infection matches with the proteins on the nerve cell. Thus, it will eventually lead to demyelination of nerves. The diagnosis of the disease can be performed by physical examination, Cerebrospinal fluid analysis (albumin cytologic dissociation, elevation of CSF protein greater than 55mg%), electromyography and Brighton criteria. Brighton criteria were created primarily for retrospective epidemiological and vaccination safety research, they are likely to have a high specificity but a low sensitivity. The Brighton criteria assign a level of diagnostic certainty to GBS, ranging from level 1 (highest) to level 4 (lowest) (lowest). The completeness of the diagnostic evidence is extremely important when using the Brighton criteria to categorize patients with suspected GBS[7]. Early identification and management of GBS is necessary to avoid the severe complication. Immunomodulation with immunoglobulin infusion and plasma exchange are the available treatment options for the GBS.

## 2. PRESENTATION OF CASE

A 43-year-old female patient presented at a tertiary trauma care hospital in south India. On admission the patient paralyzed with respiratory failure for which she was in requiring ventilatory support and ICU admission. The subject medication history shown, patient had received first dose of the COVISHIELD vaccine (ChAdOX1-S/ncov-19) on 16<sup>th</sup> July 2021 and after she experienced loose stools, malaise, throat pain within a couple of days. Patient gradually developed limb weakness and ascending paralysis with dysphagia for which the patient seek medical attention and had been hospitalized in another hospital. From there patient undergone tracheostomy and started ventilation and then referred to this hospital for conservative management. She was continued with ventilation and initiated on the weaning process alternatively with BIPAP (bilevel positive airway pressure) and CPAP (continuous positive airway pressure) mode of ventilation.

On arrival at the hospital patient's cranial nervous system examination revealed bilateral facial weakness and cardiovascular system examination shows tachycardia and hypertension. Patient had a past history of psychiatric illness and on treatment with tablet risperidone for past six months. Patient complaints of limb weakness and hence on motor examination of limb shows upper limb:3/5 and lower limb: 1/5. Patients' respiratory system examination shows posterobasal consolidation, recruiting, bilateral sliding. Patient had difficulty in swallowing, hence started on nasogastric (NG) tube feeding and nutrition provided as per calculation. Patient underwent nerve conduction study and showed predominant acute muscle potential. The laboratory investigation reports showed she was stable hemodynamically and her renal and liver parameters were normal. The examination of urine test showed cloudy urine and she was empirically prescribed with Injection Amoxicillin and potassium Clavulanate. On 16/09/2021, her urine culture report has shown Multidrug Resistance for Klebsiella

Species and managed with Injection Meropenem. Again on 19/07/2021 she had hyperthermia, her urine culture revealed pyuria and gram-negative bacilli. Hence the antibiotic was deescalated to injection piperacillin tazobactam. Patients' serum vitamin D level is found to be insufficient and hence administered with cholecalciferol capsules. Patients' local examination shows maceration of skin in cleft hence advised to apply candid powder and keep the skin dry within 10 days of application the skin condition improved.

Cerebrospinal fluid examination showed an increase in CSF protein (98mEq/Lss). Nerve conduction showed predominant acute motor poly neuropathy consistent with GBS (acute motor axonal variant of GBS). Patient undergone treatment with IV immunoglobulin for 5 days for management GBS. Mechanical and pharmacological thromboprophylaxis with enoxaparin sodium for DVT and clonidine for the management of hypertension was given. She was mobilized on a wheel chair and tablet pregabalin followed by a combination drug of gabapentin, nortriptyline and methylcobalmin for the management of painful paresthesia was started. Patient additionally developed constipation, difficulty in passing urine and greenish stool for which she was administered with syrup cremaffin and PrePro sachet and comfyo powder for optimization of bowel flora. Consulting physician advised to consider plasma exchange if there is delay in recovery but conservative management with physiotherapy and supportive care patient had started improving the muscle power within 10 days of admission. She was gradually weaned off ventilation and shifted to ward with the advice of oral feeding, 4<sup>th</sup> hourly turning, chest physiotherapy and mobilization. Her trache changed to small fenestrated tube and used for tracheal toileting. Patient was discharged to continue the rehabilitation care at home. At the time of discharge her muscle power is gradually improving from 2/5 to 3/5 and improved quadriparesis.

### 3. DISCUSSION

The novel corona virus outbreak Wuhan, Hubei, China, in November 2019 urge the need to develop vaccine globally. SARS-CoV-2 vaccinations were developed with the aim of preventing manifestations, frequently severe sickness by providing acquired immunity. Pfizer and BioNTech developed the first vaccination that was approved by the FDA and the European Medicines Agency (EMA). COVID-19 vaccines are presently available in two types: messenger RNA (mRNA) vaccines and viral vector vaccines (non-replicating adenoviral strains). The World Health Organization (WHO) has licenced vaccinations using inactivated SARS-CoV-2 strains, and they are available in various countries throughout the world. All forms of currently circulating COVID-19 vaccines have been found to be safe and effective in reducing the risk of severe infection [8]. As by now about 86% of the Indian eligible population received at least one shot of vaccine. The mass immunization programmes are conducting everywhere. However, some of the rare adverse events of vaccination have been started reporting seldomly. Our study reports the case of the COVID 19 post vaccination associated GBS after receiving ChAdOx1-S/nCoV-19 vaccine.

In a case series investigation published recently, the frequency of GBS was found to be 1.4 to 10-fold greater than expected for a population over a four-week period in which seven individuals acquired GBS in a very close temporal relationship to the first dose of ChAdOx1-S immunisation (mid-March to mid-April, 2021)[9]. Although cases had been reported with other vaccines also and clinical evidences are obtained but are insufficient to determine a more significant causal relationship between GBS and

the COVID-19 vaccination. A case report on GBS after receiving the second dose of COVID-19 vaccination [BNT162b2—Pfizer®], was been reported [10] Martina Patone et al reported that adverse events of covid -19 vaccine especially on neurological effects and divided them into two categories: (a) common but mild and (b) rare but severe and concluded Guillain-Barré syndrome is a type of unanticipated post-vaccination illness caused by molecular mimicry and subsequent neuronal injury[11].In a study conducted 28 days following a positive SARS-CoV-2 test, there was a significantly greater risk of all neurological sequelae, including Guillain–Barré syndrome (IRR, 5.25; 95 percent CI: 3.00–9.18). Overall, anticipated 38 additional occurrences of Guillain–Barré syndrome per 10 million persons who received ChAdOx1nCoV-19 and 145 additional cases per 10 million people who tested positive for SARS-CoV-2[12] [13].

Our study reports the case of the patient with GBS didn't have any known family history either any infection history. Patients motor examination, clinical features and nerve conduction study's clearly suggestive of GBS. Treatment using immunoglobulin and plasmapheresis can effectively rule out most of the GBS cases, but an early detection of disease is also essential.

#### **4. CONCLUSIONS**

The outbreak of COVID-19 and the need for being vaccinated for the prevention of corona virus become a global concern so it is essential for this case is being reported for the health care practitioners because of the need to understand the neurological manifestation regarding to COVID-19 vaccine. Determining the link between GBS and COVID-19 vaccine is also important, as people will use it as an excuse to forgo the immunization. An early identification of the condition can help to prevent the disease from progressing further.

#### **CONSENT**

The authors have acquired and saved the consent form from the patients as per the standard procedure.

#### **ETHICAL APPROVAL**

The ethical approval for the case has been acquired and saved by the corresponding authors.

#### **COMPETING INTERESTS DISCLAIMER:**

**Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.**

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