



## **Guillain-Barré Syndrome after COVID-19 Vaccine: Should We Assume a Causal Link?**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Author SK was directly responsible for admission and management of this case in ICU and is the primary author of the case report. Authors MV and SM were the residents in ICU who collected all data, researched literature and helped prepare the manuscript. Authors BJ and PHC were the faculty in ICU who were also involved in patient management and supervision of the manuscript preparation. All authors read and approved the final manuscript.*

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**Case Report**

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### **ABSTRACT**

The virus SARS-CoV2 and the disease spectrum caused by it have led to a widespread impact on the medical and economic status of all nations of the world. This led to an expedited mission to introduce a vaccine which could attempt to neutralize the pandemic to some extent. Many vaccines have been introduced with an acceptable safety profile, producing only mild adverse effects of soreness at injection site, malaise, fever, diarrhoea, myalgia and uncommonly allergic/anaphylactic reactions and possibility of getting infected with SARS-CoV2. Some isolated reports have also emerged of serious thromboembolic phenomena and neurological complications such as Guillain-

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**Barré Syndrome (GBS).**

A similar incident was noticed at our institute, where a 71 year old male recipient of COVID-19 vaccine at an immunization centre, presented to us with features of GBS. We hereby report this case, not establishing a direct link between the two, but to raise awareness regarding the ongoing mass immunization world-wide.

*Keywords: Guillain-barré syndrome; GBS; COVID-19; SARS CoV2; vaccination; immunization; mechanical ventilation.*

## **1. INTRODUCTION**

The year 2020 will be highlighted in history as the year COVID-19 pandemic led to immense and lasting medical and economic devastation. Such was the catastrophe, that the search for an effective vaccine became almost urgent. Vaccines typically require years of research and trials, but in the year 2020, scientists were forced to embark on a race to produce safe and effective vaccines against SARS-CoV2 virus. As of today, seven vaccines have been approved for full use, with another six in early or limited use. Another 83 vaccines are currently in phase 1-3 trials and 77 more are under active animal investigation [1].

Guillain-Barré Syndrome (GBS) is an acute inflammatory disorder involving peripheral nervous system and leads to severe and sometimes, lasting paresis/paralysis in afflicted patients. The possibility of COVID-19 related neurological complications, including GBS have been widely reported. [2,3]. Multiple other vaccines like influenza, tetanus, polio, meningococcus, hepatitis B, and importantly an orally administered adenovirus vaccine have been implicated in causing the occasional case of GBS as an adverse event [4,5,6]. The world is currently in the middle of one of the largest vaccination drive in the history of infectious diseases. These facts lead to the relevance of reporting the odd case of GBS after COVID-19 vaccination, as published by Waheed et al [7], in order to establish or refute the association between the vaccine and the syndrome itself. We, hereby, report a case of a 71 year male patient who developed GBS within 1 week of receiving COVID-19 vaccination.

## **2. CASE PRESENTATION**

A 71 year old male, known hypertensive and diabetic, controlled on oral medication, presented to our casualty with complaints of multiple episodes of loose stools and vomiting for the past 2 days. This was followed by progressive

weakness in both lower limbs, spreading in an ascending fashion and then to both upper limbs. This was accompanied by some difficulty in swallowing, slurred speech and fast breathing. There were however, no other neurological symptoms like loss of consciousness or seizures. On examination, the blood pressure and blood glucose were within normal range, but the patient appeared tachypnoeic, with a respiratory rate of 28 per minute, with some subcostal recession. The gag reflex and swallowing were poor and the single breath count (SBC) was only 15. The power in upper limbs was 2/5 at elbow and shoulder joint (movement possible when excluding gravity) and 0/5 at wrist and fingers. In lower limbs, the power was 0/5 (complete absence of movement) at all joints. On careful probing, it was revealed that the patient had received COVID-19 vaccination (Covishield, AstraZeneca, University of Oxford) in the nearby vaccination centre 6 days before onset of the first symptom of diarrhoea. The 6 day period between vaccination and first symptom was completely uneventful with no other symptoms, respiratory or otherwise. No other significant past or personal history was found relevant. A working diagnosis of GBS was agreed upon, pending investigations.

In view of the deteriorating bulbar involvement and a possible causal link with COVID-19 vaccine, the patient was quickly shifted to the ICU of our hospital. Here, it was decided to intubate and institute supportive mechanical ventilation, in view of further deterioration in the SBC [8], progressive tachypnoea, laboured breathing and an absent gag reflex. Pressure support ventilation was adjusted to blood gas analysis. All routine blood work including haemogram, kidney function, electrolytes, liver function and coagulation panel were within acceptable limits. COVID-19 RT-PCR was found negative. Nerve Conduction Studies (NCS) were requested, which showed features of Acute Inflammatory Demyelination Polyradiculopathy (AIDP). After consultation with neurology department, GBS was confirmed and the patient

as well as the family were counselled regarding the disease. The same was relayed to the hospital as well as district COVID-19 Immunization Surveillance Committee. Supportive ICU care including early nasogastric feeding, thromboprophylaxis and limb and chest physiotherapy were instituted. Apart from this, intravenous human immunoglobulin (IVIg) therapy was started in the cumulative dose of 2g/kg in 5 daily divided doses. Presently, at day 13 of ICU stay, the power in both upper and lower limbs had improved to 3/5 in elbow joint and 1/5 in wrist and fingers. In lower limbs, it was 1/5 at knee joints. The gag reflex continues to be poor and the patient is soon heading towards a tracheostomy. No autonomic disturbances, as may be seen in GBS, have been noted.

### 3. DISCUSSION

GBS is an inflammatory disease of the peripheral nervous system, which is fatal in 3-5% of patients and leaves residual disability in about two-thirds of them [9]. Over half of the patients afflicted with GBS reveal the history of an infection preceding the onset of weakness. The commonest triggering infection world-wide is a gastroenteritis caused by *Campylobacter jejuni* [10]. Many others (cytomegalovirus, influenza, *Mycoplasma pneumoniae*, Zika, dengue virus, chikungunya) are also implicated as triggering infections [11]

COVID-19 disease, which initially started as a respiratory illness, was soon reported to cause extra-pulmonary effects as well, including neurological [12,13]. Filosto et al. [14] published a series of 34 GBS cases in the North Italian population of 8.4 million, and calculated a rate of 47.9 cases of GBS per 100 000 COVID-19 infections. In a prior case series published by our hospital (Goel et al. [15]), we have also reported neurological manifestations of COVID-19 disease presenting to our hospital, out of which 2 presented with GBS.

The reason post-vaccination GBS is relevant can be traced back to the 'swine-flu' vaccination in 1976/77 in New Jersey, USA. There was a spike in GBS cases post the vaccine drive, with an initial relative risk calculated to be 7.6 in the 6 weeks following vaccination [16]. This led to a halt in the programme, but not without implanting the lasting idea of an association between immunization and GBS. Since then, many other vaccines have been implicated in causing GBS as an adverse effect, notably 2008/09 H1N1

influenza season [17,18]. No causal links have been proven till date despite individual reports being widely published.

All this leads to the relevance of reporting any case of GBS immediately following COVID-19 immunization. Through this case report, we are neither trying establish, nor refute a causal link between any COVID-19 vaccine and GBS. Such a link needs widespread case control studies. Our aim is to merely start a discussion on the ongoing massive immunization programme worldwide and highlight any extraordinary event that may follow the vaccine. This may also be relevant because of the rapidly developed vaccines, accelerated trial programmes, hurried drug licensing and vaccine production, may leave room for error which needs close scrutiny under the microscope by scientific community.

### 4. CONCLUSION

To conclude, during the ongoing COVID-19 pandemic and the parallel massive vaccination programme worldwide, it becomes prudent to know about the various adverse effects which may accompany COVID-19 vaccine, GBS has previously been linked to other vaccines also, and although not yet causally linked, isolated case reports like ours necessitate investigation on a larger scale.

### CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

### ETHICAL APPROVAL

It is not applicable.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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