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

ABSTRACT

Guillain–Barré syndrome (GBS) is an autoimmune demyelinating disorder 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 Guillain–Barré syndrome 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 failureetc. 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-oldfemale patient admitted seeking ventilatory support for respiratory failure 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.

Comment [Kinfe1]: The background points are same as the main introduction section. Make it two or three short to the point sentences---summarize it

Comment [Kinfe2]: Come to the point association with Post Covid-19

1.INTRODUCTION

Guillain–Barré syndrome (GBS) is a heterogenous group of reactive, self-limited, immune mediated acute paralytic polyneuropathy involving sensory, motor and autonomic nerves[1].Every year, approximately 100,000 people worldwide develop the condition[2]. Jean -Baptiste Octave Landry in 1859 first described about theGuillain–Barré syndrome (GBS).Jean – Alexandre Barre and Andre Strohl, sixty years after Georges Guillain, separated this condition from poliomyelitis-induced paralysis.[3]. Hence it isreferred as Landry-Guillain-Barré-Strohl syndrome or Guillain-Barré-Strohl syndrome, however it is more often referred to as the Guillain-Barré syndrome (GBS).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]. The incidence of Guillain–Barré

Comment [Kinfe3]: Do you think Covid-19 vaccination is contraindicated for GBS case or what is the science behid. Say something your point with regard to the association between these two.

Comment [Kinfe4]: References need to be cited using a reference manager software-Mendeley,...

UNDER PEER REVIEW

syndrome (GBS), an immune-mediated polyradiculoneuropathy with a 5% death rate, is 0.81-1.91 cases /100,000 person-years globally [4].

Guillain-Barre syndrome (GBS) has been linked to a variety of infectious agents, including Campylobacterjejuni, 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 areflexianumbness, dysphagia, facial weakness, bowel and bladder dysfunction etc. Later on, leads to respiratory failure, cardiac arrythmia, 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 fluidanalysis (albuminocytologicdissociation, 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 sedated and paralyzed with respiratory failure for which she requiring ventilatory support and ICU admission. Patient had received the COVISHIELD vaccine (ChAdOX1-S/ncov-19) on 16th July 2021 and developed loose stools, malaise, throat pain within a couple of days after the vaccination. 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. Patients' complaints about temperature spike and dysuria then the examination of urine routine shows cloudy urine and started

Comment [Kinfe5]: Some very impotant elements may not be included.

Comment [Kinfe6]: For how long before adimision this happened?

UNDER PEER REVIEW

on treatment with meropenem and deescalated to piperacillin tazobactam for urinary tract infection caused by multi drug resistant klebsiella species. 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.

Patient undergone treatment with IV immunoglobulin for 5 days. 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+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 comfygo 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, 4th hourly turning, chest physiotherapy and mobilization. Her tracheа 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 goal of preventing symptomatic, frequently severe sickness by providing acquired immunity.The vaccine bring about by Pfizer and BioNTech was the first to acquire FDA and European Medicines Agency approval (EMA). COVID-19 vaccines are currently available in two forms: messenger RNA (mRNA) vaccines and vaccinations using a viral vector (non-replicating adenoviral strains). The World Health Organization (WHO) has licenced vaccinations using inactivated SARS-CoV-2 strains, and they are available in many 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 bynow 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 periodin 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]. Another study conducted on published articles related to adverse events of covid -19 vaccine especially on neurological effects and divided

Comment [Kinfe7]: Is it a secondary article like meta analysis.

UNDER PEER REVIEW

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'thave 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.

REFERENCES

1. Hahn AF. Guillain-barré syndrome. The lancet. 1998:22;352(9128):635-41.
2. Willison HJ, Jacobs BC, van Doorn PA. Guillain-barre syndrome. The Lancet. 2016 13;388(10045):717-727.
3. Dimachkie MM, Barohn RJ. Guillain-Barré syndrome and variants. Neurologic clinics. 2013 ;31(2):491-510.DOI: 10.1016/j.ncl.2013.01.005PMCID: PMC3939842

UNDER PEER REVIEW

4. Shao SC, Wang CH, Chang KC, Hung MJ, Chen HY, Liao SC. Guillain- Barré Syndrome Associated with COVID-19 Vaccination. Emerging infectious diseases. 2021 ;27(12):3175. DOI: 10.3201/eid2712.211634PMCID: PMC863219
5. Gálvez LA, Abadía LR, de los Reyes Guevara CA, Orozco JH. Guillain-Barre syndrome after vaccination for Covid-19. The first report in Latin America. Neurology Perspectives. 2021:1;1(4):236-238.
6. Hardy TA, Blum S, McCombe PA, Reddel SW. Guillain-Barré syndrome: modern theories of etiology. Current allergy and asthma reports. 2011 ;11(3):197-204. DOI:10.1007/s11882-011-0190-y
7. Van Den Berg B, Walgaard C, Drenthen J, Fokke C, Jacobs BC, Van Doorn PA. Guillain–Barré syndrome: pathogenesis, diagnosis, treatment and prognosis. Nature Reviews Neurology. 2014 ;10(8):469-482.
8. Fragkou PC, Dimopoulou D. Serious complications of COVID-19 vaccines: A mini-review. Metabolism Open. 2021 Oct 30:100145.
9. Marammatom BV, Krishnan P, Paul R, Padmanabhan S, Soumya CV, Syed AA, Mangat HS. Guillain-Barré syndrome following ChAdOx1-S/nCoV-19 vaccine. Annals of Neurology. 2021: 10.
10. Trimboli M, Zoleo P, Arabia G, Gambardella A. Guillain-Barré syndrome following BNT162b2 COVID-19 vaccine. Neurological Sciences. 2021 ;42(11):4401-4422.
11. Garg RK, Paliwal VK. Spectrum of neurological complications following COVID-19 vaccination. Neurological Sciences. 2021:31:1-38.
12. Patone M, Handunnetthi L, Saatci D, Pan J, Katikireddi SV, Razvi S, Hunt D, Mei XW, Dixon S, Zaccardi F, Khunti K. Neurological complications after first dose of COVID-19 vaccines and SARS-CoV-2 infection. Nature medicine. 2021: 25:1-10.
13. Moideen S, Uvais NA, Rajagopal S, Maheshwari V, Gafoor TA, Sherief SH. COVID-19-Related Stigma Among Inpatients With COVID-19 Infection: A Cross-Sectional Study From India. Prim Care Companion CNS Disord. 2021 Jan 7;23(1). doi: 10.4088/PCC.20br02853. PMID: 33411996.

UNDER PEER REVIEW