

Guillain-Barré Syndrome in COVID-19: A Probable Association

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Abstract

Guillain-Barré syndrome (GBS) is characterized by areflexia, albuminocytologic dissociation, and progressive motor weakness. It has been associated with preceding viral infections.

We report a case suggestive of a possible link between GBS and prior COVID-19 infection. A 20-year-old female from Dhankuta, with a history of COVID-19 infection diagnosed one month earlier, presented to the emergency department at B.P. Koirala Institute of Health Sciences (BPKIHS) with a two-day history of ascending paralysis. Based on the Brighton Criteria, a clinical diagnosis of GBS was suspected. In the context of the COVID-19 pandemic, GBS associated with SARS-CoV-2 infection should be carefully differentiated from other causes of neuropathy and myopathy. A high index of suspicion is essential for timely diagnosis and management.

Keywords: COVID-19, Guillain-Barré syndrome, Nepal

Declarations

Ethics approval and consent to participate: Not applicable

Consent for publication: An informed consent was obtained from the patient for the publication of the case report. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Availability of data and materials: Data will be made available upon request.

Competing interest: None.

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INTRODUCTION

Guillain-Barré syndrome (GBS) is characterized by progressive motor weakness, areflexia, and albumin cytologic dissociation [1]. Cranial nerve palsies are frequent manifestations in GBS. Among cranial nerve palsies, facial nerve palsy is the most common in GBS. Incidence ranges from 0.89 to 1.89 cases (median, 1.11) per 100,000 person-years [2]. It typically occurs after infection with *Campylobacter jejuni*, *Mycoplasma pneumoniae*, influenza virus, Epstein-Barr virus, or Cytomegalovirus [3]. Coronavirus is rarely associated with GBS [4], but there are few cases that have reported COVID-19 associated with GBS [5]. Most studies have reported cases of GBS occurring after vaccination, particularly following the administration of the Ad26.COV2 vaccine [6, 7]. In March 2020, a study from Italy reported GBS after the coronavirus disease 2019 (COVID-19) onset. Four of these patients had lower-limb weakness and paresthesia, and one patient reported a facial diplegia followed by ataxia and paresthesia [8]. Few cases of Guillain-Barré syndrome (GBS) linked to COVID-19 have been reported in Nepal [9, 10]. The present case study aims to document a case affected by GBS related to COVID-19 infection.

CASE

A 20-year-old female, from Dhankuta, presented to the emergency ward of B.P. Koirala Institute of Health Sciences (BPKIHS) on 29th July 2021 at 7:00 pm. She was in the usual state of health in the last 2 days when she developed weakness of the body, which was insidious in onset, gradually progressive, severe enough to disturb her daily physical activities. It was associated

with headache and about 3-4 episodes of vomiting that contained recently ingested food particles. She also developed abnormal jerky movements of hands, which lasted for a few seconds, and multiple episodes associated with blurry vision. She gave a history of confirmed COVID-19 on 17th June 2021, for which she was admitted and discharged after 7 days. During her hospital stay, she developed diarrhoea and was managed conservatively. There was no history of loss of consciousness, double vision, visual loss, facial deviation, dysphagia, bowel or bladder incontinence, shortness of breath, fever, cough, body rashes, or any known drug allergy. There was no history of recent vaccination and immunizations as well as no history of recent trauma. She is a non-smoker, doesn't consume alcohol, and consumes a mixed diet. She also had regular menstrual periods. On examination, she was alert; Blood Pressure (BP) was 120/80 mm of Hg; Respiratory Rate was 20/min; Temperature of 98.1°F; Pulse Rate of 104/min; SpO₂ of 98% in room air and spot glucose of 108mg/dl. Laboratory reports were within normal limits. Widened palpebral fissure was present. Other cranial nerves were intact. Neck rigidity was absent. There was bilateral flaccid weakness of limbs with Medical Research Council (MRC) scales of 3/5 in all limbs. The osteo-tendon reflexes were hypoactive and areflexia in all limbs; Babinski's sign was positive. No sign of papilledema. Lumbar puncture was not done. CT scan of the head and spine revealed normal findings.

The timeline and course of clinical events of GBS related to COVID-19 are shown in **Figure 1**.

GBS related to COVID-19 infection diagnosis was suspected based on Brighton Criteria and referred to other hospitals for intensive care and ventilatory support,

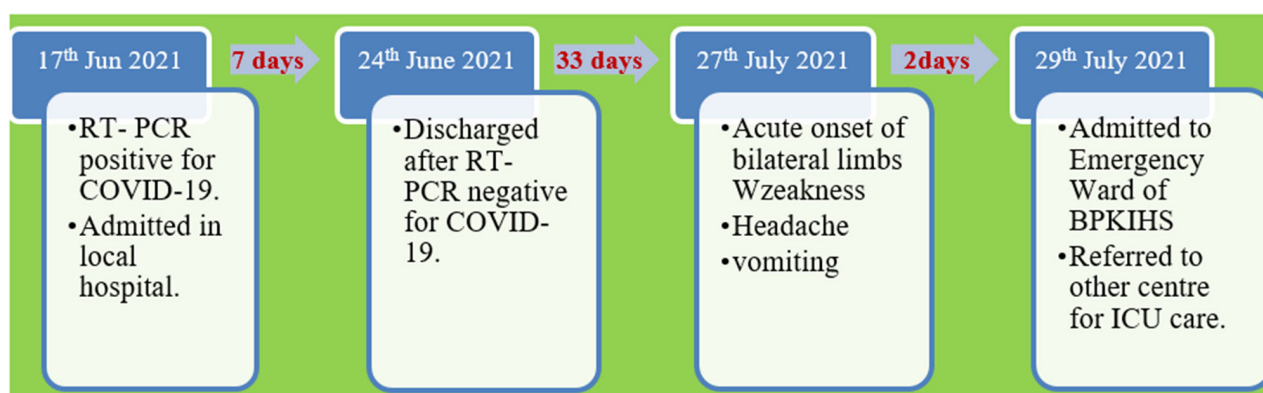


Figure 1: Timeline and clinical events, diagnosis, and treatment. RT-PCR Reverse transcriptase polymerase chain reaction, COVID-19 coronavirus disease-2019, ICU: Intensive Care Unit.

and intravenous Immune Globulin. She was continuously followed up, and after a week of Intensive Care Unit (ICU) admission, she was successfully transferred to the medical ward and discharged from hospital. She was in regular follow-up for three months, and to date she is continuing her normal regular activities.

DISCUSSION

GBS has been reported in association with COVID-19 in the literature; however, the strength of this link, the underlying mechanisms, and the clinical pattern remain uncertain. Though headache and vomiting are not common features in GBS, the presence of a sudden onset of headache may point towards GBS [11]. According to a Medline search conducted up to June 22, 2020, the average time for neurological symptoms to appear after the onset of COVID-19 was 11 ± 6.5 days, with a range of 3 to 28 days. The mean age of the patients was 58.7 years, with a male-to-female ratio of 1.5:1 [12].

The level of diagnostic certainty was classified into four levels according to the Brighton criteria (BC): level 1 fulfills all diagnostic criteria; level 2 fulfills all clinical parameters, without the final results from LP and EPS; level 3 fulfills only clinical parameters; and level 4 does not fulfill the criteria of level 3, but all other diagnoses are excluded, (Table 1). Cerebrospinal fluid (CSF) and nerve conduction

studies (NCS) analyses have been noted as possible pitfalls due to shortage of personal protective equipment (70%, $p = 0.44$) and insufficient care to quarantined (60%, $p = 0.11$) during covid-19 pandemic surge [13]. The BC criteria have been used as a tool to assist diagnosing GBS with sensitivity of 84% for level 2 and 86% for level 3 by Ghazanfar H et al. [14] as shown in **table 1**.

At admission, neuroimaging, particularly spinal MRI scans, has emerged as a useful diagnostic tool for differentiating ascending paralysis caused by GBS from other causes of acute myelopathy [15]. As our patient met the clinical criteria, a strong clinical suspicion of GBS based on the Brighton criteria was possible in our patient. A limitation of this case report is the lack of supportive lab investigations, the diagnosis is based solely on clinical parameters, partly due to the constraints imposed by the COVID-19 pandemic.

CONCLUSION

Based on clinical criteria, there is a probable association between GBS and COVID-19 patients. The case study challenges the expertise to consider GBS-related COVID-19 during the pandemic. Therefore, early identification of symptoms and treatment is crucial at the index visit, thus minimizing potential complications.

Table 1: Diagnostic criteria and level of diagnostic certainty for Guillain-Barré syndrome

Diagnostic criteria	Level of diagnostic certainty			
	1	2	3	4
Bilateral and flaccid weakness of limbs	+	+	+	+/-
Decreased or absent deep tendon reflexes in weak limbs	+	+	+	+/-
Monophasic course and time between onset and nadir of 12 h to 28 days	+	+	+	+/-
CSF cell count < 50/ml	+	^a	-	+/-
CSF protein concentration > 0.45 g/L	+	+/- ^a	-	+/-
NCS findings consistent with one of the subtypes of GBS	+	+/-	-	+/-
Absence of alternative diagnosis for weakness	+	+	+	+

Note: If CSF is not collected or results are not available, nerve electrophysiology results need to be consistent with the diagnosis of Guillain-Barré syndrome; +: present; -: absent; +/-: present or absent; CSF: cerebrospinal fluid; NCS: nerve conduction studies; GBS: Guillain-Barré syndrome.

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