

Clinical Considerations in Highly Suspicious Guillain-Barre Syndrome Associated with COVID-19: Case Series

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Abstract

The association between Guillain-Barre Syndrome (GBS) and Coronavirus disease 2019 (COVID-19) infection has been reported by recent multiple case reports. Current recommendation for management on neurological manifestation suspicious for GBS after COVID-19 is to treat it with standard course of intravenous immunoglobulin (IVIG) or plasmapheresis. The patient in first case had severe neurological manifestation after COVID-19 and was managed with IVIG. However, the patient ended up getting intubation, and eventually was discharged to long-term acute care (LTAC) after undergoing trach and percutaneous endoscopic gastrostomy (PEG) tube placement. In second case, patient had milder neurological symptoms after COVID-19, and GBS was suspected based on outpatient electromyography. Patient was sent to hospital immediately for IVIG therapy and had excellent recovery in functional status. In third case, patient had neurologic symptoms highly suspicious for GBS which started after getting intubation for hypoxemia from COVID-19 infection. However, the patient did not get treatment for GBS after thorough neurological evaluation because risks of treatment of GBS outweighed the benefits given the patient's highly critical clinical condition. Eventually, the patient had poor outcome. From this case series, it seems that diagnosing GBS as early as possible in patients with COVID-19 infection is important since the outcome can be altered as they may benefit from treatment for GBS.

Keywords: COVID-19; Guillain-Barre Syndrome; IVIG; Neurologic Manifestation of COVID-19; D-Dimer

Abbreviations

GBS: Guillain-Barre Syndrome; COVID-19: Coronavirus Disease 2019; IVIG: Intravenous Immunoglobulin; LTAC: Long-Term Acute Care; PEG: Percutaneous Endoscopic Gastrostomy

Introduction

COVID-19 is an enveloped, single-stranded, positive RNA virus that is known to affect the respiratory and the gastrointestinal system, but in a few selected cases, it can present with neurological manifestations, including GBS [1]. Current recommendation for COVID-19 associated with GBS is to treat neurological symptoms with IVIG or plasmapheresis [2]. However, in this case series, we are presenting three cases that COVID-19 patients who also had significant neurological symptoms, which were highly suspicious for GBS, to show how these cases were managed in different ways of thoughtful individualized approaches that were individualistic to each case presentations.

Case Series

Case 1

We are presenting a case of a 52-year-old woman with no significant medical history who was tested positive for COVID-19 one week prior to presentation. Initially, she experienced loss of smell and taste only for 1 day. However, 3 days later, she experienced bilateral

lower extremity numbness, weakness and tingling, starting from both of her feet. It progressively worsened, and she began experiencing dysphagia. In addition, she experienced change in her voice, urinary incontinence, and dysphagia. On presentation to the hospital, she was noted to have loss of reflexes on bilateral lower extremities in conjunction to decreased rectal tone. In addition, weakness on bilateral lower extremities and numbness on both lower and upper extremities were appreciated. She also required a high amount of oxygen supply due to hypoxia. Computed tomography of her lumbosacral spine showed mild disc bulge in L4/5 and L5/S1 but did not show any significant spinal canal stenosis. Due to a suspicion of GBS-like syndrome associated with COVID-19, patient was initially monitored in the ICU for FVC and NIF. However, patient became severely hypoxic shortly after her admission, requiring intubation. She was treated with Remdesivir and Decadron for her COVID-19 and received IVIG for her GBS symptoms. An attempt for extubation failed as the patient had significant stridor, requiring re-intubation immediately. Patient eventually underwent trach placement and ultimately, underwent PEG tube placement. Patient was sent to LTAC facility upon discharge from the hospital.

Case 2

We are presenting another case of a 72-year-old male with hypertension who had prior asymptomatic COVID-19 infection about 6 weeks prior to admission. He was never hospitalized or treated for COVID-19 at that time. However, four weeks after COVID-19 infection, he started to feel tingling on the back of his right hand, then the sensation progressively spreading to bilateral lower extremities the next day. He underwent outpatient neurology evaluation with electromyography test, which revealed reduced conduction velocities across non-entrapment sites, prolonged distal response durations and slowed conduction velocities with absent F waves, A waves, and reduced recruitment highly concerning for possible GBS. Subsequently, patient was hospitalized and was treated for IVIG therapy with close respiratory mechanics monitoring. Upon presentation to the hospital, patient had bilateral lower extremities numbness, paresthesia, and gait abnormalities without any bowel or bladder incontinence. His respiratory mechanics were within normal limit throughout his hospitalization, and he did not experience dysphagia. On the day of discharge, patient endorsed of some degree of neurological subjective improvement and was sent home with home physical therapy. He required a walker for ambulation only for approximately 48 hours after discharge, then his ambulation became steady without requiring assistance. One month post discharge, he endorsed some tingling sensation on the upper extremities, but was able to climb stairs without difficulty and without assisted device.

Case 3

This case includes a 71-year-old male with past medical history of coronary artery disease and hypertension. He presented with complaints of fever and productive cough after a travelling to Mexico in April of 2020 and was found to be positive for COVID-19. Initially, patient was placed on nasal cannula and then transitioned to non-rebreather due to increasing oxygen requirements. Due to refractory hypoxemia on non-breather, patient was intubated early during his hospital course. He was treated with hydroxychloroquine, azithromycin and steroids. Patient's hospital course was complicated by pancreatitis, Clostridium difficile colitis, and atrial fibrillation. Along with hypoxemia, patient required ventilation support due to poor mental status. Seizures were ruled out as video electroencephalogram was unrevealing. However, patient started to have severe weakness with absent movements in his extremities. CT head did not show any acute pathology, and a concern for GBS associated with COVID-19 emerged. Neurology was consulted and it was concluded that it will be rather difficult to differentiate between GBS and critical illness neuromyopathy. However, the recommendation was made not to treat the case for GBS even if was the diagnosis due to patient's acuity. The challenges of treating GBS would entail hypercoagulability with IVIG along with volume shifts and possible hypotension with plasmapheresis. Hence, patient did not receive treatment in spite of a high suspicion for GBS and eventually required tracheostomy and PEG tube placement due to poor mental status and persistent hypoxia.

Discussion

GBS is an immune-mediated response in which, through molecular mimicry, the immune system attacks the peripheral nervous system [1]. Although, it is not commonly reported in USA, it is not a rare association when considering the global cases reporting the associa-

tion between the two. One of the earliest reported cases were in Wuhan, China by Mao, *et al.* where they concluded that these symptoms were associated with a more severe COVID-19 course [3]. In another case series from India, they reported development of GBS symptoms within five to ten days after the onset of COVID-19 and excellent response to IVIG in such cases [4]. Our patient in the first case did receive IVIG but her presentation of GBS symptoms occurred sooner than reported in other case reports, including oropharyngeal involvement. There have been multiple theories on the pathogenesis of its association. One of them postulates that the virus attacks the peripheral neurons and enters the cell body to reach the brain through a retrograde fashion. Another proposes direct damage through the cytokine-related injury and hypoxia-related sequela. There does appear to be an association between COVID-19 and GBS but further investigations are required to better understand the pathophysiology and correlation.

Current general recommendation on management of GBS associated with COVID-19 is to treat GBS as if it is typical GBS patient. In several similar case reports, as in the case of our second patient, after following standard management protocol using IVIG or plasmapheresis, patients had desirable outcome, such as being able to walk independently [4,5]. IVIG, which is known to rarely increase risk of thrombosis, was actually shown to suppress by modulating immune responses and was tried in COVID-19 treatment [6]. Plasmapheresis also can cause hypotension due to the effect of volume shift [7] and it is undesirable to use in patient in shock. Therefore, as the decision in 3rd case was made not to pursue treatment for GBS, we always need to be mindful in making decision to treat GBS in COVID-19 patient after carefully weighing the benefits versus risks. Of note, in our first case, D-dimer was dramatically increased from 0.53 (pre-administration of first IVIG) to 7.53 (16 hours after first IVIG dose). In this context, close monitoring D-dimer after administration of IVIG seems to be clinically very important especially considering that this could also be a reflection of the COVID-19 virulence as well.

Conclusion

In conclusion, there appears to be significance in diagnosing GBS early in COVID patients as their prognosis and course can alter as they may benefit from treatment with plasmapheresis and IVIG.

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