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Case Report

Guillain Barré Syndrome Associated with Covid-19: A Case Report

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Abstract

The WHO has declared the COVID-19 outbreak a Public Health Emergency of International Concern on 30th January, 2020, and a pandemic on 11th March, 2020. Cases have been reported in 226 countries and territories around the world. More than 517 million people worldwide have been infected so far, with a global mortality rate of approximately 1.2%. The causative agent is a virus designated the SARS-CoV-2. It was initially thought to be solely a respiratory pathogen, however, many observational studies and case reports have documented a high rate of multisystem complications associated with COVID-19. There is growing evidence that SARS-CoV2 infection could be associated with various neurological complications as well, including but not limited to - headache, dizziness, febrile seizures, encephalitis, encephalopathy, stroke, and acute peripheral nerve diseases. Amongst all the observed neurological manifestations occurring in COVID-19 infected individuals, the commonest ones are ischemic stroke, Guillain-Barré Syndrome (GBS), and hypoxic encephalopathy.

Keywords: COVID-19; SARS-CoV2; WHO

Background

Hematogenous spread, axoplasmic spread, and direct invasion might be the various modalities by which the SARS CoV virus enters the central nervous system. The virus can be transported across the blood-brain barrier by direct transport in the form of endocytic vesicles across endothelial cells and pericytes. Similar mechanism of viral entry into the central nervous system across the blood-CSF barrier in the choroid plexus has also been demonstrated. The viral particles may also cross the BBB via infected leukocytes.

GBS (Landry-Guillain-Barré-Strohl Syndrome) is an acute, frequently severe, fulminant, immune-mediated polyneuropathy that affects motor, sensory, and autonomic nerves. It is the one of the commonest causes of acute or subacute generalised paralysis in general practice. It consists of a wide range of neurological manifestations, the commonest being rapidly progressive flaccid paralysis which can involve the respiratory muscles as well leading to respiratory failure. The types of GBS include regional variants: Miller Fisher Syndrome of ophthalmoplegia, ataxia, and areflexia; Cervico-brachial-pharyngeal weakness, often with ptosis; Oculopharyngeal weakness; Predominant paraparesis; Bilateral facial or abducens weakness with distal paresthesias; Ophthalmoplegia with GQ1b autoantibodies, and systemic variants: Acute inflammatory demyelinating polyneuropathy (AIDP) which is a motor-sensory demyelinating disorder; Acute motor axonal neuropathy (AMAN), and Acute motor and sensory axonal neuropathy (AMSAN), both of which are axonal disorders; Generalized ataxia without dysarthria or nystagmus, Pure sensory variant, Pandysautonomia.

Respiratory paralysis in these patients can be due to either GBS or COVID-19 pneumonia.

Hence, it is important for physicians to recognise and manage GBS early in all patients with COVID-19, because, respiratory compromise due to GBS may be rapidly progressive, but also highly treatable with excellent prognosis if caught early.

Case Report

A 48-year-old male presented to the emergency department with three days history of weakness of both lower extremities which was progressive, ascending in nature, and associated with paraesthesias in both lower limbs. The patient had a history of sore throat and fever two weeks before and was diagnosed to have COVID-19 upper respiratory tract infection with a positive RT PCR test. He was managed with home isolation and conservative treatment. The fever had subsided within 3- 4 days but the patient had a mild dry cough at the time of presentation. On examination, pt had bilateral, symmetrical flaccid paraparesis, with power 3/5 in both lower limbs, requiring assistance with standing and walking. Modified Erasmus GBS Outcome Score on day 1 of admission was 4. Over the next two days, the weakness progressed to involve bilateral upper extremities without respiratory muscle involvement. At this stage power was 2/5 in all four limbs, deep tendon reflexes were absent and there was no cranial nerve or sensory system involvement. mEGOS was 10. The patient had no comorbidities like diabetes, hypertension, thyroid disorders, and no history of similar complaints in the past. The patient also had no history of diarrhoea before the onset of the weakness.

Repeat oropharyngeal COVID- 19 test was negative. Routine investigations like complete blood picture, ESR, serum electrolytes, renal function tests, thyroid profile, and serum Vitamin B12 were done and were all within the normal range. MRI brain and MRI spinal cord showed no significant findings.

Lumbar puncture and CSF analysis were done. It showed albumino-cytological dissociation with CSF protein >500 mg/dL, white cell count 2/microL, glucose 160 mg/dL, no growth on culture, and negative for SARS-CoV RTPCR. Nerve conduction study was done and showed prolonged F-wave latencies, prolonged distal latencies, and reduced CMAPs- features suggestive of demyelination. Diagnosis of AIDP was confirmed with level 1 diagnostic certainty as per Brighton Criteria.

The patient received a course of IVIG at a dose of 0.4 gm/kg body weight/day which was given for 5 days (total dose given: 2 gm/kg body weight). Following the IVIG therapy, there was a moderate improvement in power. The patient was discharged with slight residual weakness- power in both lower limbs was 4+/5, and in both the upper limbs power was 4-/5. mEGOS at discharge was 4. The patient underwent physiotherapy after discharge and his residual weakness gradually subsided over 2-3 months.

Discussion

GBS is one of the commonest neuromuscular complications reported with COVID-19. Hundreds of cases of GBS associated with COVID have been reported to date. There is a wide range of age at presentation and can occur in anyone from children to elderly. The duration between the onset of GBS and COVID-19 may be variable ranging from onset of GBS preceding COVID-19 symptoms to onset of GBS succeeding COVID-19 symptoms, with most patients developing GBS after the onset of COVID-19 symptoms. Amongst the GBS-variants, AIDP is the commonest type, followed by AMAN, and AMSAN. Other GBS variants such as MFS, pandysautonomia, paraparetic GBS, and the cervico-brachial-pharyngeal variant, are uncommon to rare. It has also been noted in some studies that COVID-19-associated GBS has a higher incidence of mortality than GBS occurring due to non-COVID causes.

The immune-mediated phenomenon in COVID-associated GBS seems to be a reasonable explanation for most patients who have demonstrable autoantibodies. However, there is a group of patients in whom the symptoms of GBS either precede or are almost concurrent with the symptoms of COVID-19, in whom the immune-mediated mechanism doesn't seem plausible. In a post-infectious process, the time period between the onset of symptoms of COVID-19 and the onset of GBS features is sufficient enough for the production of autoantibodies and triggering an autoimmune process. Whereas, in a para-infectious process, the time interval is not enough for the production of autoantibodies. Therefore, an alternative mechanism must be explored which explains the disease process in those with no demonstrable autoantibodies. In the second scenario some possible theories are, either the symptoms of COVID infection were not appreciable before the onset of the autoimmune complication, or the virus was capable of causing direct damage to radicles and nerves.

Our case presented with ascending type of flaccid paralysis leading to quadriplegia, areflexia, and no cranial nerve or sensory

system involvement, two weeks after being diagnosed with COVID-19 infection. His CSF analysis, and Nerve Conduction Study confirmed the diagnosis of the AIDP variant of GBS. However, this is a case of post-infectious GBS, whereas, many of the cases of COVID-associated GBS reported so far have been para-infectious. Our patient showed significant improvement after a 5-day course of IVIG [1-6].

Conclusion

According to the case reports from around the world, there is a strong possibility that GBS is linked to the COVID-19 infection. However, more cases from should be reviewed and further investigations should be carried out to better understand this condition. Due to the possible association between GBS and COVID-19, it is recommended that all physicians must follow up COVID infected patients concerning neurological manifestations to identify them early. Open discussions in the medical community are needed to explore how to balance rehabilitation needs and optimum healthcare utilization with safety considerations to provide the best possible care to patients affected by COVID-19 associated with GBS, especially since respiratory failure and other complications caused by GBS are easily reversible with early diagnosis and treatment.

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