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Case series of Guillain Barre Syndrome variants associated with COVID-19 infection

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ABSTRACT

The novel corona virus has wreaked havoc in both developing and developed countries. The respiratory effects of the virus were well reported early on but with each passing day, effects of covid-19 on others systems came to light. In this report, we bring forward the series of Guillain-barre syndrome (GBS) cases with the varying presentation in covid infected patients. In our cases, GBS either occurred during ongoing covid symptoms or within the two weeks of resolution of covid related pulmonary symptoms. Through this case series, we are reporting one case each of garden variety, AMAN variety and Miller Fisher variant of GBS. We aim to supplement the already existing limited data available on other systemic illnesses associated with covid-19 and to make physicians aware of the potential neurological diagnosis in covid cases.

Key words: Guillain Barre Syndrome, COVID, neurologic disorder.

INTRODUCTION

The spectrum of neurological manifestations of covid-19 range from simple headaches to strokes and even extending to demyelinating disorders. About one-third of covid patients present neurological symptoms. Some of these symptoms have proved to be specific such as loss of taste or smell, but others can be non-specific, including dizziness, or a reduced level of consciousness.

The mechanism by which the covid-19 virus may predispose patients to GBS is still poorly understood but the ability of the virus to cause widespread inflammation in the body might play a role in the mechanism of GBS cases in covid infected patients. The clinical presentation along with nerve conduction studies and CSF analysis are the main modalities of GBS diagnosis. All variants of GBS have been linked to covid-19 including the most severe Miller Fisher variant.

CASE DESCRIPTIONS:-

CASE 1

A 64-year-old male with a recent history of covid pneumonitis and no comorbidities, presented in OPD with weakness of b/l Lower limbs from the last 4 days and weakness of b/l upper limbs from the last 2 days. He also had difficulty in lifting his neck since morning along with paraesthesia in bilateral feet. There was no history of bladder or bowel dysfunction. There was no complaint of diplopia, dysphagia or nasal regurgitation of liquids. He was previously admitted to the same hospital for treatment of covid pneumonitis and was discharged only 4 days before the day of presentation. On examination, he had a normal GCS of 15/15. Bilateral facial and neck weakness on observed on cranial nerve examination. The breath holding time was 10 seconds. Power in Upper limbs was grade 3 proximally and grade 4- distally. In lower limbs, it was grade 2 both proximally and distally. There was generalized areflexia. Sensory examination was within normal limits except for the loss of joint position

sense and vibration in bilateral great toes. Syndromic diagnosis of "ASCENDING LMN QUADRIPARESIS WITH MINIMAL LARGE FIBER SENSORY INVOLVEMENT WITH RESPIRATORY INVOLVEMENT WITHOUT BLADDER AND BOWEL" was made.[Garden variety LGBS]

INVESTIGATIONS–

Nerve Conduction studies(NCS) showed Demyelinating sensorimotor polyradiculoneuropathy.

CSF – shows classical albumin cytological dissociation (2 WBCs, bothlymphocytes, Protein= 323 mg/dl, Glucose = 60 mg/dl).

The patient wastreated with intravenous immunoglobulins 2 gm/Kg over 5 days and he recovered partly over the next 6 weeks. He continues to have bilateral foot drop with some residual arm weakness at the time of writing this article.

CASE 2

A 51-year-old female with no comorbidities and recent covid illness presented with complaints of weakness of b/l Lower limbs from the last 3 days and weakness of b/l upper limbs from the last 1 day. There was no history of bladder or bowel dysfunction. The patient did not report any sensory symptoms, diplopia, dysphagia or nasal regurgitation of liquids. She was recently diagnosed with covid-19 6 days ago. On examination, she had a GCS of 15/15 with bilateral facial and neck weakness on cranial nerve examination. The breath-holding time was 9 seconds. Power in Upper limbs was grade 2 proximally and grade 3 distally. In Lower Limbs, it was grade 2 proximally and distally. There was generalized areflexia and sensory examination was within normal limits.

INVESTIGATIONS

Nerve Conduction studies (NCS) demonstrated pure motor axonal neuropathy.

CSF examination showed classical albumin cytological dissociation(6 WBCc, all lymphocytes, Protein= 105 mg/dl, Glucose = 55 mg/dl).

Covid -19 Antibodies were positive.

HRCT chest depicted multifocal peripheral old healed lesions related to Covid 19 illness.

Patient was diagnosed as a case of Probable Post Covid LGBS- AMAN (Acute Motor Axonal Neuropathy) variant and was treated with intravenous immunoglobulins 2 gm/Kg over 5 days and patient recovered partly over the next 6 weeks. He continues to have bilateral foot drop at the time of writing this article.

CASE 3

A 74-year-old male presented with mild URTI with loss of taste and smell for 3 days. He was diagnosed as a case of mild covid -19 illness. After 24 days of covid diagnosis, he developed ptosis in right with binocular diplopia. Within two days, he developed difficulty in maintaining balance while walking. He gave no history of limb weakness, sensory complaints, dysphagia, nasal regurgitation of liquids, bladder or bowel involvement. On examination, the patient had bilateral ptosis (asymmetrical), bilateral complete external ophthalmoplegia (Pupillary response was present), bilateral facial weakness with normal motor strength and sensory examination. All reflexes were absent. Gait Ataxia was present but finger to nose test was negative. Possibilities include myasthenia Gravis, Brain stem Stroke /Space occupying lesion, LGBS Variant? Miller Fischer or ??Polyneuritis cranialis were considered.

INVESTIGATIONS

Nerve Conduction studies (NCS) showedimpersistent F waves.
CSF showed albumin-cytological dissociation(3 WBCs, all lymphocytes, Protein= 215 mg/dl, Glucose = 58 mg/dl).
Myaesthenia gravis serology tests were negative and MRI Brain with optic nerve cuts did not show any significant abnormality.
Covid antibodies came out to be positive.
Patient was diagnosed as a case of Miller Fischer variant of LGBS and treated with IVIG 2gm/kg over 5 days followed by tapering dosages of steroids over 28 days. Patient improved completely over the next two months.

	Age	Gender	Timeline of symptoms	NCS	CSF findings	Treatment	Response
case 1	64 years	MALE	After 14 days of initial covid diagnosis (postcovid)	Demyelinated sensorimotor polyradiculo-neuropathy	2 WBC (both lymphocyes) P- 323mg/dl G- 60mg/dl	IVIG 2mg/kg over 5 days	Improved over 6 weeks (still has residual B/L foot drop and arm weakness)
case 2	51 years	FEMALE	After 6 days of initial covid diagnosis (Parainfectious)	Pure motor neuronal axonopathy	6 WBC (all lymphocyes) P- 105mg/dl G- 55 mg/dl	IVIG 2mg/kg over 5 days	Improved over 6 weeks (still has residual B/L foot drop)
case 3	74 years	MALE	After 24 days of initial covid diagnosis (post covid)	Impersistant F waves	3 WBC (all lymphocyes) P- 215mg/dl G- 58mg/dl	IVIG 2mg/kg over 5 days	Improved completely over 8 weeks

DISCUSSION

Landry-Guillain Barre Syndrome (LGBS) is an autoimmune disorder that has been known to be associated with bacterial infection, viral infections and even immunization. It usually develops within 2-4 weeks post a triggering event. Most of the cases reported have been the ones that developed after infection with Campylobacter jejuni. Other agents may involve the Influenza virus, Cytomegalovirus, Epstein-Barr virus (1).
There has been an ongoing discussion about neurological manifestations of covid-19. Recent data has depicted an association between the development of LGBS and Covid-19 illness. A case series study was published demonstrating the same in covid-19 patients in Wuhan, China (2). Similarly, few other case reports were also published in the following months (4, 5). We

report 3 cases of covid related GBS, out of which one is parainfectious and two post-infectious.

The aetiology of covid related para infectious or post-infectious Landry-Guillain Barre Syndrome is not well understood but the immunological phenomenon definitely underlies its development as auto-antibodies directed against ganglioside complexes have been detected in these patients(6). Covid-19 infection is also known to cause cytokine storm, modulating the immune response system of the patients. This is also a probable mechanism by which SARS-CoV-2 infection potentially triggers the onset of GBS. CSF levels of different cytokines like IFN-γ, IL-4, IL-17, and IL-22 are high in GBS, and IL-17 and IL-22 levels are implicated with worse disease severity (8-10). A systematic review of multiple cases of GBS associated with covid-19 infection was done which depicted that the clinical picture of GBS associated with covid-19 infection was somewhat similar to the classical cases of GBS or GBS associated with Zika virus infection(7).

We add to the already available data by reporting a series of 3 cases of GBS associated with Covid-19 infection. Each of these patients developed signs and symptoms of GBS within a span of 2-4 weeks after being diagnosed with the covid-19 infection.

In all our patients, the weakness started in the lower limbs which progressed to upper limbs (just like non-covid related GBS cases). They were all treated with IVIG and recovered fully. Management of GBS associated with covid-19 remains the same as the classical GBS cases.

CONCLUSION

A physician should keep in mind the possibility of GBS development in covid-19 patients. Timely identification and diagnosis would result in prompt treatment and better care of the patients. This becomes even more important as many of these patients present initially with neurological manifestations, without any previously diagnosed covid illness. Some of these demonstrate positive covid-19 antibodies, while others show a positive result for current infection. There have been varying assumptions regarding the nature of the development of GBS in such patients. Further evaluation and research have to be done to confirm whether these cases develop para-infectiously or post-infectiously. The presentation, diagnostic features, and laboratory studies in GBS cases related to covid were similar to those of the classical GBS cases. All our patients responded exceptionally well to the classic GBS treatment regimens.

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