Miller Fisher syndrome associated with COVID 19

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Abstract

Miller Fisher syndrome (MFS), is an acute peripheral neuropathy, a variant of Guillain-Barre syndrome, that develops following exposure to different viral, bacterial, and fungal pathogens. Patients usually present with a triad of ophthalmoplegia, ataxia, and areflexia. During Covid pandemic MFS has been described associated with novel coronavirus disease 2019 (COVID-19). Here we describe the clinical course, Cerebrospinal fluid (CSF) findings, nerve conduction studies, treatment and outcome of the patient having MFS concurrent with COVID 19.

Keywords: COVID-19, GBS, MFS, SARS-CoV-2

Introduction

On 11 March 2020, SARS-CoV-2 was declared as a pandemic by the World Health Organization. In this disease, majority of the patients are asymptomatic or may manifest as a severe acute respiratory syndrome (SARS) with a variable degree of severity, with elderly and comorbid patients with diabetes cardiovascular diseases and other risk factors bearing a major brunt.[1] Angiotensin-converting enzyme 2 receptor on epithelial cells across various organs plays a significant role for the entry of the virus into the cells,[2] these receptors are found in neurons and glial cells resulting in various neurological manifestations. In a study of 214 patients with COVID 19, neurological manifestations were present in 36.4% of patients.[3] Anosmia and aguesia have been found frequently with COVID along with peripheral nervous system (PNS) and central nervous system (CNS) involvement. Only a few cases of Miller Fisher syndrome (MFS) associated with COVID 19 have been reported. As COVID 19 patients are treated at every level of health care, from primary to tertiary care, it becomes imperative for primary care physicians to be well versed with neurological manifestations of COVID 19 including MFS. We hereby present a case of MFS having concurrent infection with SARS-CoV-2.

Case Presentation

A 22-year-old male was presented at our center with 1-week history of fever, rhinorrhea and body aches. Since the last 4 days, he also complained of swaying to either side while walking, tingling sensations in both hands and feet. His family members also noticed drooping of eyelids over the last 2 days. On examination, the patient was febrile (temperature 38°C) with tachycardia (pulse rate 106/minute), blood pressure of 120/70 mm Hg, tachypnea and oxygen saturation of 92%. On neurological examination, higher mental functions were intact, there was bilateral ptosis, right more than left [Figure 1] with lateral gaze restriction bilaterally [Figures 2 and 3]. Muscle tone and strength were normal, vibration and position sense were
Baseline investigations revealed normal blood counts, kidney and liver function tests were normal. Chest X-ray revealed bilateral infiltrates with High-resolution computed tomography (HRCT) chest showing bilateral patches of consolidation. Qualitative real-time reverse transcriptase polymerase chain reaction assay for SARS-CoV-2 was done on the patient's oropharyngeal swab testing positive. C-reactive protein (CRP) (12.41 mg/dl) and Ferritin (472 μg/l) were raised and the blood culture was sterile. CSF examination revealed 05 cells (lymphocytes), protein-90 mg/dl and glucose-80 mg/dl with sterile blood and urine cultures. Non-contrast CT head was normal. Nerve conduction studies (NCS) revealed decreased amplitude of Compound motor action potential (CMAP’s) of bilateral ulnar, median and peroneal nerves, decreased amplitude of Sensory nerve action potential (SNAP’s) of ulnar and median nerves with sural sparing.

In view of COVID 19 illness and neurological syndrome of ophthalmoplegia, ataxia and areflexia with albuminocytological dissociation and NCS findings, diagnosis of Miller Fisher syndrome concurrent with SARS-CoV-2 infection was made. The patient was treated with IV immunoglobulins (IVIG) on day 4 of admission to the hospital in view of his neurological syndrome. He received 400 mg/kg of IVIG daily for 5 days. He showed substantial improvement in ataxia from day 3 of treatment with IVIG. Cranial neuropathies also improved markedly after the completion of treatment. The patient was discharged after 2 weeks of hospital stay. At 8 weeks of follow up, the patient had complete resolution with no neurological deficit.

Discussion

Fever and respiratory symptoms are well recognized features of COVID 19 infected patients, around 100 publications have described neurological findings affecting the PNS, CNS and muscular system of patients with COVID-19 infection. MFS is one of the variants of the GBS, described by the triad of ophthalmoplegia, ataxia and areflexia. MFS is preceded by upper respiratory tract in most patients, accounting for 1%–5% of cases of GBS, with males affected than females. Molecular mimicry between an infectious agent and anti-ganglioside antibodies (anti-GQ1B in the case of MFS) is the mechanism responsible for disease manifestation in patients with Guillain-Barre syndrome (GBS). In studies about Middle East Respiratory Syndrome, it was found that human coronaviruses have the neuroinvasive capacity and can induce GBS type illness. SARS-CoV-2 affects the nervous system directly by neuroinvasive capacity and indirectly by an inflammatory response. Only 12 patients with COVID-19 associated MFS have been reported to date. In MFS-associated with COVID 19 mean time for the onset of symptoms was 14.75 days after the diagnosis of COVID-19, however, two cases were reported as MFS concurrently with COVID-19 infection. In our case also, the patient presented with concurrent COVID 19 illness. The most common symptoms of COVID-19 associated MFS were ataxia in 57.1% of patients, ophthalmoplegia in 42.9%
of patients, generalized areflexia in 42.9%, all features were present in our case. Electrodiagnostic features of delayed F-Wave have been reported, NCS in our patient revealed primary axonal loss with sural sparing. CSF examination in our patient revealed albumin-cytological dissociation, reported in five out of six patients of MFS with COVID-19 previously.[13] Two patients of MFS with concurrent COVID-19 illness were treated with IVIG with marked improvement.[13,14] In view of the COVID 19 pandemic, patients are being managed at every level of the health care facility and specific covid designated hospitals and not all such hospitals to have neurological super specialities available. All physicians should be accustomed to neurological manifestations of COVID 19. Neurological complications like MFS should be suspected and diagnosed early, as it shows an excellent response to IVIG. The patient was treated with IVIG for 5 days, patient showed substantial improvement in ataxia and ophthalmoparesis, with complete resolution of symptoms after 2 months of follow up.

Conclusion

New neurological symptoms and presentations of COVID-19 continue to emerge. Neurological assessment becomes imperative to recognize and treat syndromes like MFS early in COVID 19 pandemic. As a primary care physician neurological manifestations like MFS should be diagnosed early and treated or referred to a higher center for appropriate treatment.

Take Home Message

Neurological manifestation of COVID 19 like MFS, should be suspected and diagnosed early as rapid treatment results in excellent response.

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Declaration of patient consent

Written informed consent from the patient was obtained for publication of this case report including images.

Ethical approval

Not applicable.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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