

Guillain-Barré Syndrome Associated with SARS-CoV-2 Infection: A Case Report

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Abstract

A 56-year-old man was referred to the emergency department for the subacute onset of and weakness in the lower extremities, paraesthesia and pain. He was diagnosed with SARS-CoV-2 pneumonia and then, he received the necessary treatment according to national protocol. Radiographic, laboratory, and electroneurographic findings indicated an acute polyradiculoneuritis with prominent demyelination and suggesting the diagnosis of Guillain-Barré syndrome associated with COVID-19 infection.

Key Words: COVID-19; SARS-CoV-2; Guillain-Barré syndrome.

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Nowadays, world healthcare systems are facing the pandemic of the severe acute respiratory coronavirus 2 (SARS-COV-2) and its associated disease, named coronavirus disease 19 (COVID-19). This virus is a new human pathogen, and currently, there are no specific treatment options or vaccinations.¹ COVID-19 mostly affects the respiratory system, ranging from mild flu-like symptoms to severe pneumonia, but extrarespiratory multisystemic involvement has also been reported.² Li et al.³ recently described the neuroinvasive potential of COVID-19 and at the time of this writing, at least two similar cases of acute dysimmune neuropathy were reported associated with SARS-CoV-2 Infection.^{4,5} Rapid transmission and possible complications needs early accurate diagnosis and close follow up. Emergency medical Service and Aeromedical Transportation teams (as flight crew), are at higher risk and taking care of their health and protect them (as the first line of patient's contact) from mortality and morbidity, are very important.

Materials and Methods

Case presentation

A 56-yr-old male was referred to emergency ward for flu-like syndrome (fever, chills, headache, myalgia, cough, fatigue and diarrhea) from 5 days ago. He denies other symptoms, tobacco and drugs use or abuse and significant past medical history. He had total flight hours of 12120 in transportation operations.

As an expert active paramedic, he passed his necessary flight crew annual aeromedical check-up 176 days ago, successfully.

Results

Due to COVID-19 pandemic and many hours on-the-job close contact with suspected and definitive cases, his nasopharyngeal specimen was tested for reverse transcription-polymerase chain reaction (RT-PCR) and its result was positive. Chest CT scan showed multiple bilateral ground glass opacities and consolidations, typical of COVID-19 pneumonia (Figure1).

He received the necessary treatment based on the national protocol for COVID-19 infection and at the end of the 2 weeks home quarantine period, on the follow up session, except of mild malaise, clinical condition was well and

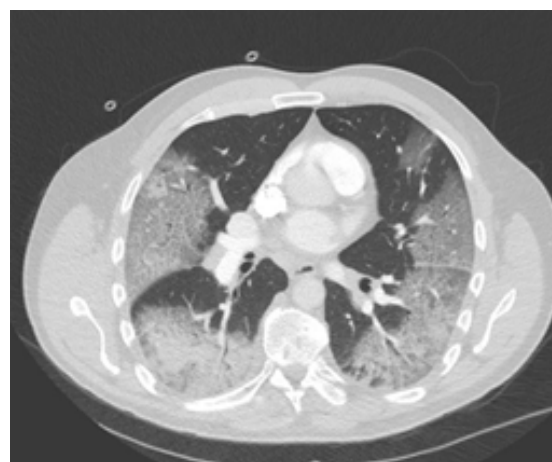


Fig1. Chest CT scan showed multiple bilateral ground glass opacities and consolidations.

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Table.1 Significant Laboratory Findings

Laboratory Tests	Results	
Arterial Blood Gas	PH=7.29	
	Carbon Dioxide Pressure= 47 mmHg	
	Oxygen Pressure= 77.5 mmHg	
	Bicarbonate = 30 mEq/L	
	Oxygen Saturation= 91 %	
Haematology	White Blood Cell = 13500 / μ L	Lymphocyte= 6 %
		Neutrophil= 92 %
	Red Blood Cell = 4.000.000 / μ L	
	Hemoglobin= 11.4 gr/dL	
	Hematocrit= 37.8 %	
	Platelet= 120000 / μ L	
	Blood Culture in 3 times= No growth	
Serology	C-Reactive Protein = ++	
	Erythrocyte Sedimentation Rate = 35	
Cerebrospinal Fluid Analysis	Reverse Transcription Polymerase Chain Reaction for SARS-CoV-2 RNA = Negative	
	White Blood Cell (Predominately Lymphocyte)= 7 / μ L	
	Protein= 49 mg/dL	
Cerebrospinal Fluid Culture	No growth	

candidate to return to work soon. Few days later, he confronted a subacute onset of progressive lower limbs weakness, paresthesia and pain which rapidly evolving to a severe, flaccid paraparesis during 12 days. Neurologic

examination showed normal consciousness (GCS=14) and verbal, no cranial nerves abnormality, muscles weakness with Medical Research Council score = 1/5 at lower limbs, extensive stocking-and-glove hypesthesia at

Table 2. Proposed infections antecedent of Guillain-Barré syndrome

Viruses	Bacteria
Adenovirus	Brucella
Coronavirus	Campylobacter Jejuni
Coxsackievirus	Haemophilus Influenza
Cytomegalovirus	Helicobacter Pylori
Epstein-Barr Virus	Listeria Monocytogenes
Echo Virus	Mycoplasma Pneumoniae
Hepatitis A, B, C and E	Pasteurella Tularensis
Herpes Simplex	Salmonella Typhosa
Herpes Zoster	Shigella
Human Herpesvirus Type 6	Yersinia
Human Immunodeficiency Virus	
Influenza A and B	
Japanese Encephalitis Virus	
Measles	
Mumps	
Parainfluenza	
Respiratory Syncytial Virus	
Variola	
West Nile Virus	

the both legs, absent deep tendon reflexes and normal plantar response, symmetrically. Mild dyspnea, moderate pain (pain scoring = 6/10) in low back and severe paresthesia in both legs were the important patient's complains. Urgent assessment findings included: normal brain and spinal CT scan, absence of both sural nerve sensory action potential (SAP) and the tibial nerve compound muscle action potential (CMAP), increased common peroneal CMAP distal latency, decreased velocity, severely decreased CMAP amplitude for the same nerve on electroneurography. Significant laboratory findings are summarized in Table 1.

These findings indicated a moderate to severe form of acute polyradiculoneuritis with prominent demyelinating features and represented diagnosis of Guillain-Barré syndrome (GBS) associated with COVID-19 infection. Because of the possibility of sudden respiratory deterioration and need for endotracheal intubation and ventilation support, he was admitted at intensive care unit (ICU) and high-flow oxygen (70-80%) via non-rebreather bag mask. High-dose intravenous immunoglobulins (0.5 g/kg/d for 5 days) were started immediately.

Despite rapid and effective diagnosis and treatment about a month after the onset of therapeutic measures with no need to ventilation support, significant improvement in sensory-motor abnormalities begun, but complete recovery was not achieved. Due to the recurring and disabling nature of GBS and its therapeutic complications, the final decision to return to his flight service, as a flight crew, requires more time and more thorough follow-up, but will likely never be released.

Discussion

GBS is a typical post-infectious disorder and two-thirds of adult patients report preceding symptoms of a respiratory or gastrointestinal tract infection within 2-4 weeks of onset of weakness.⁶ Proposed antecedent infections associated with GBS are listed in Table 2.⁷

Cases of GBS have also been reported shortly after vaccination with rabies vaccine and various types of influenza A virus vaccine.⁸ Extra respiratory multi-systemic involvement of SARS-CoV-2 has also been reported and neurological manifestations are not common but reported during the acute phase and treatment period.^{1,2} In particular, COVID-19 is a neurotropic, neuroinvasive, and neuroinflammatory virus. Experimental animal studies reported that they cause acute flaccid paralysis (AFP) and demyelination.^{9,10} Recently, a case of Acute Myelitis after SARS-CoV-2 infection was reported, too.¹¹

In conclusion, we reported a possible correlation between acute COVID-19 infection and GBS, a condition that in recent years has been linked to other emergent microbial infections. This interesting and rare COVID-19 neurological complication is important reminding our colleagues that diagnosis and treatment of COVID-19 infection is not a brief process, but it is only the beginning

of a long road. The authors believe that, these days, accurate continuous evaluation and follow-up of patients is the missed ring in fighting chain of COVID-19 pandemic.

List of acronyms

CMAP - compound muscle action potential
COVID-19 – Coronavirus disease 19
GBS - Guillain-Barré syndrome
GCS - Glasgow Coma Scale
ICU - intensive care unit
RT-PCR - reverse transcription-polymerase chain reaction
SAP - sensory action potential
SARS-CoV-2 – Severe acute respiratory corona virus 2
CoV-2 – Coronavirus 2

Authors contributions

MD,HS, and AAF conceived and designed the experiments, performed the data analyses and wrote the paper. All authors have read and approved the typescript.

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Conflict of Interest

The author declares no competing interests.

Ethical Publication Statement

We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

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