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Case Report

Acute Polyradiculoneuritis in A COVID-19 Patient

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Abstract

It was found that the infection with Severe Acute Respiratory Syndrome Coronavirus 2 may lead to the appearance of several complications, including neurological ones. The aim of this article is to present the first and only case of acute polyradiculoneuritis in a COVID-19 patient diagnosed in our Infectious Diseases Clinic. Epidemiological, clinical and laboratory data were presented and analysed. Succesive development of the two diseases might suggest a link between the infection with the new coronavirus and the Guillain-Barré syndrome.

Keywords: Acute Polyradiculoneuritis; Guillain-Barré Syndrome; COVID-19

Abbreviations

ALT: Alanine Transaminase; AST: Aspatate Transaminase; cm: centimeters; COVID-19: Coronavirus Infectious Disease 2019; CSF: Cerebrospinal Fluid; DL: Deciliter; EBV: Epstein Barr Virus; ESR: Erythrocytes Sedimentation Rate; G: Gram(s); GBS: Guillain Barré Syndrome; IgM: Immunoglobulin M; IU: International Units; IV: Intravenous; HAV: Hepatitis A Virus; HCV: Hepatitis C Virus; K: Potassiu; Kg: Kilogram(s); L: Liter(s); Mg: Milligram(s); Mm^3: Cubic Millimeter; Mmol: Millimoles; MRC Scale: Medical Research Council Muscle Power Assesment Scale; Na: Sodium; Ng: Nanogram(s); Pg: Picogram(s); PO: Per Os; RT-PCR: Real Time Polymerase Chain Reaction (test); SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus-2; SC: Subcutaneous; VCA: Viral Capsidal Antigen; WBC: White Blood Count

Introduction

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is a newly discovered virus, generating Coronavirus Infectious Disease 2019 (COVID-19). It was first detected in Wuhan city, Hubei province, in People's Republic of China in late December 2019 and it is responsible, since March 2020, for the current pandemic. The main targets for SARS-CoV-2 are the respiratory tract and the blood vessels, but other tissues and/or organs may be affected as well. Anosmia and ageusia were frequently reported during the first waves of COVID-19. Most patients with anosmia did not report nasal obstruction or rhinorrhea, leading to the conclusion that, most probable, the symptom is due to direct virus damages of the olfactory nerve route. Similarly, ageusia is probably caused by viral interference with the gustatory nerve fibers [1-3]. Other neurologic involvements - meningitis, encephalitis, encephalomyelitis, stroke, venous sinus thrombosis or Guillain-Barré Syndrome (GBS) - were described and the acting mechanisms seems to be either direct virus damages or mediated alterations due to immune processes, inflammation and / or procoagulable status [4-7]. However, relation between GBS and COVID-19 is not clear [8].

The aim of this paper is to present the first and only (so far) case of acute polyradiculoneuritis associated with COVID-19, diagnosed in the Infectious Diseases Department of the Hospital no. 3 from Craiova, Romania. Written informed consent has been obtained from the patient to publish this paper. The study was approved by the Ethics Committee of University of Medicine and Pharmacy of Craiova (protocol code 211/08.12.2021).

Case Presentation

On July 19th, 2020, the patient, male, 41 years old, was complaining of low-grade fever and sudden decrease of muscle strength in lower limbs, symptoms noted for the last two days. Ten days earlier he has attended a party, after which he and some of the participants reported respiratory and digestive symptoms within the next 4 days. He was consulted by a neurologist who suspected a Guillain-Barré syndrome; in order to be admitted into the hospital, due to the epidemiological requirements imposed by the COVID-19 pandemic, he was sent to the Infectious Diseases Clinic to be tested for the infection with the Severe Acute Respiratory Syndrome Coronavirus-2. A real-time polymerase-chain reaction test for SARS-CoV-2 was taken and while waiting for the result, he was admitted in the hospital. Initial clinical evaluation showed an alert patient, with a body temperature of 36.9 degree Celsius, a heart rate of 89 beats per minute, normal blood pressure and an oxygen saturation of 98% while breathing air. His body weight was 109 kg and his height was 180 cm. He was not able to rise up from the bed, nor to move his lower limbs when asked for. Also, he was not able to lift a one-kilogram (kg) weight using the muscle of the upper limbs. Deep tendon reflexes were absent for the lower limbs and diminished for the upper limbs. No sensory deficit or stiff neck were noted. The rest of the clinical examination was normal. The patient's initial tests are presented in Table 1.

Parameter (units)	Value	Normal range
Hemoglobin (g/dL)	13.1	12-15
WBC (/mm^3)	8000	4000-9000
Neutrophils (%)	53.2	60-65
Eosinophils (%)	0.8	1-2
Lymphocytes (%)	40	25-50
Monocytes (%)	6	4-8
Platelets (/mm^3)	403000	150000-400000
ESR (mm/h)	22	10-12
seric glucose (mg/dL)	115.5	60-120
seric creatinine (mg/dL)	0.91	0.6-1.2
ALT (u./L)	96.4	< 40
AST (u./L)	31.5	< 40
Na^+ (mmol/L)	139	138-142
K^+ (mmol/L)	4.1	3.5-5
urinalysis	normal	-
CSF aspect	clear	
CSF cells (/mm^3)	12	6-10
CSF protein level (mg/dL)	132	< 40
CSF glucose level (mg/dL)	72.6	60% from seric glucose
CSF chlorine level (mg/dL)	771	680-800

Table 1: Initial blood, biochemical and CSF tests for the presented patient.

The following microbiological tests were recorded: RT-PCR SARS-CoV-2 positive, ELISA HIV negative, IgM anti VCA EBV negative, HBs antigen negative, anti HCV negative, IgM anti HAV negative, negative throat swab. RT-PCR SARS-CoV-2 was used to test the CSF, but the result came negative. Also, serologic tests for enteroviruses were negative. Diagnosis of acute polyradiculoneuritis and COVID-19 was established. On July 20th, at the request of the patient, he was transferred in a Neurology Clinic from Bucharest. The clinical examination performed here found spontan lumbar pain irradiated in both lower limbs, positive Lasegue maneuver (at 30-45◦), left sided nystagmus, hypotonia and predominantly distal flaccid tetraparesis (Table 2).

Location	Value (MRC scale)
Left upper limb	4/5
Right upper limb	3/5
Left lower limb	3/5
Right lower limb	2/5

Table 2: Muscle power assesment for the presented patient.

A CT scan performed on July 20th revealed pulmonary lesions suggestive for COVID-19 pneumonia affecting 15% of the lung parenchyma. Additional tests are presented in Table 3.

	Value	Normal range
Creatinkinase (i.u/L)	210	55-170 (male)
Creatinkinase MB (i.u./L)	9.9	3-5% of total creatinkinase level
PRO-BNP (pg/mL)	5.57	< 125
Procalcitonin (ng/mL)	0.04	< 0.1
C reactive protein (mg/L)	2.71	< 10

Table 3: Additional tests performed in the Neurology Clinic for the presented patient.

Electrodiagnostic tests showed aspects suggestive for demyelinating polyradiculoneuropathy. Taken into account all the data, the diagnosis of GBC (possibly SARS-CoV-2 related) was maintained. The patient was treated with i.v. immunoglobulin (Intratect, 220 g for 5 days), Enoxaparin 40 mg/day s.c., Hydrocortisone hemisuccinate 100 mg/day i.v, Paracetamol 1 g/day p.o. and Omeprazol 40 mg/day p.o. The patient's evolution was favorable and he was discharded on July 25th 2020. A RT-PCR test for SARS-CoV-2 performed prior to hospital release was negative.

For the next 12 months the patient underwent physiotherapy procedures, with almost complete recovery. However, a fine tremor of the upper limb fingers persists.

Discussion

The first case of GBS in a COVID-19 patient was reported in January 2020 in China [8]. Our case is the first and only GBS in a SARS-CoV-2 infected patient recorded in our clinic so far during the COVID-19 pandemic. To the best knowledge of the authors, as regarding Romanian patients, there was just one previous report of nine cases [9].

Correlations between GBS and SARS-CoV-2 infection have been reported in medical literature, but a clear causal link is still a matter of debates. Most reports are case presentation or small series. An Italian study [10] found an increased incidence of GBS associated with COVID-19 as compared with pre-pandemic situation (1.41 cases/100,000 persons/year vs 0.89 cases/100,000 persons/year in 2019), however, another study performed in United Kingdom found no statistical evidence of an association between GBS cases and COVID-19, but a decrease in incidence during the pandemic period [11]. It seems that most cases were recorded during the first two waves of the pandemics and males (68% of cases) with an average age of 59 years old were mostly affected [12,13]. Our case fits as regarding gender of the patient and time of occurence during the pandemic development, but his age is lower than the calculated average. However, from the patient's personal history is to be noted a previous spinal column trauma, decade ago, due to a car crach; a systematic review found that neurological trauma might facilitate the development of GBS and we suggest that the patient's accident might have predisposed him to this [14].

Most GBS cases occurred after 11 days from the onset of COVID-19 pathogenically, the main feature is immune-mediated neurological damages, but there are a few reports of positive SARS-CoV-2 PCR tests and positive IgG anti SARS-CoV-2 antibody index in the CSF suggesting that the coronavirus might also have a direct contribution as well [12,15-17]. For the presented case, the GBS was diagnosed 6 days after the onset (which might suggest a direct SARS-CoV-2 neuronal aggresion), but the RT-PCR assay was negative for the presence of the novel coronavirus in the CSF; it is possible that the faster neurological development might be a consequence of the previous spinal column trauma.

We have tested for other possible etiologies of GBS and the results came negative, but we were not able to rule out the Campylobacter jejuni infection, the main cause of acute polyradiculoneuritis. Most cases of GBS have a good evolution under the treatment and the mortality rate is low [13]. Our case had a good evolution after immunoglobulin therapy and physiotherapy, with almost complete recovery after 12 months.

Conclusion

This is another COVID-19 patient diagnosed with Guillain Barré syndrome. The question regarding simple association or causality between these two diseases still persists and more data are needed to clarify this aspect.

Authors' Contribution

LIG, CI and AN designed the study, collected and analyzed the data, wrote the original draft andapproved the final paper.
CI and IS analysed the data, critically reviewed the paper.
LIG, CI, IS and AN approved the final version of the paper.

Conflict of Interest

The authors have no conflict of interest to declare.

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