CLINICAL/SCIENTIFIC NOTES OPEN ACCESS

Guillain-Barré syndrome related to SARS-CoV-2 infection

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Neurol Neuroimmunol Neuroinflamm 2020;7:e785. doi:10.1212/NXI.0000000000000785

The outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) responsible for coronavirus disease 2019 (COVID-19) led to the death of thousands of people around the world.[1] Neurologic manifestations are not much specific apart from acute anosmia, and post-infectious manifestation data are missing.[2] We described the cases of 2 patients exhibiting demyelinating form of Guillain-Barré syndrome (GBS) and summarized neurologic manifestations and investigations results in table 1.

A 43-year-old man presented with cough, asthenia, and myalgia in legs, followed by acute anosmia and ageusia with diarrhea the next day. Symptoms resolved spontaneously after 2 weeks. Twenty-one days after the beginning of respiratory symptoms, he presented with in a rapidly progressive manner paraesthesia, hypoesthesia, and distal weakness in the lower limbs. In the following 2 days, these symptoms extended to the midthigh and tip of the fingers associated with ataxia, and he was hospitalized at day 4 because a right peripheral facial palsy had occurred. His body temperature was 36.9°C and oxygen saturation was 99%. Neurologic examination disclosed decreased light touch from midthigh to feet and the tip of the fingers; decreased vibration sense in the lower limbs, symmetric weakness for dorsiflexion and extension of the toes (Medical Research Council [MRC] score = 3/5) and flexion of the thigh (MRC = 4/5); and areflexia in the forelimbs apart from the left biceps reflex.

Laboratory results at day 4 were unremarkable (normal blood cell count, negative C-reactive protein, negatives HIV, Lyme, and syphilis serologies). Antigangliosides antibodies were negatives. Nasopharyngeal swab test was positive for SARS-CoV-2 on reverse transcription-polymerase chain reaction (RT-PCR) assay. CT of the chest showed ground-glass opacities in 10–25% on both lungs (figure e-1, links.lww.com/NXI/A267). CSF results showed normal cell count (1×10^6/L), increased protein level (0.94 g/L), and negative SARS-CoV-2 on RT-PCR assay. MRI at day 7 showed multiple cranial neuritis (in nerves III, V, VI, VII, and VIII), radiculitis, and plexitis on both the brachial and lumbar plexus (figure e-2, links.lww.com/NXI/A267). Nerve conduction studies at day 9 showed 2 conduction blocks (>50%) in both peroneal nerves, decreased motor conduction velocities in both peroneal and tibial nerves approximately 30–37 m/s, a sural sparing pattern, abolition of the H-reflex, and slightly increased of F-wave latencies supporting demyelinating pattern (table e-1, links.lww.com/NXI/A267). The patient was diagnosed with GBS, and IV immunoglobulin infusions (IVIg) were started at day 5 (2 g/kg). He was rapidly discharged home with progressive improvement.

An obese 70-year-old woman presented with anosmia and ageusia, followed by diarrhea for 2 days. She complained of mild asthenia and myalgia without fever. All symptoms resolved excepted anosmia and ageusia. Nasopharyngeal swab test was positive for SARS-CoV-2 on RT-PCR assay. Seven days later, she presented with acute proximal tetraparesis and distal forelimb and perioral

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The Article Processing Charge was funded by the authors.

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Table 1 Clinical characteristics and investigations result for 2 patients with GBS related to SARS-CoV-2 infection

Patient	Days between the onset of COVID-19 and GBS	GBS symptoms and signs	CSF findings	Nerve conduction studies	MRI results	Treatments and evolution
1. Man 48 yo	21 d	Flaccid paraparesis, generalized areflexia, lower-limb and distal upper-limb paresthesia, ataxia; right facial palsy (day 4)	Day 4; protein level: 0.95 g/L; cell count: 1×10^6/L; negative SARS-CoV-2 RT-PCR	Day 9; demyelinating pattern with motor decreased conduction velocities and conduction blocks	Day 7; radiculitis and plexitis on both brachial and lumbar plexus; multiple cranial neuritis (in nerves III, VI, VII, and VIII)	Day 5; IVIg (2 g/kg); progressive improvement
2. Woman 70 yo	10 d	Flaccid tetraparesis, generalized areflexia, forelimb paresthesia; respiratory failure (day 3)	Day 3; protein level: 1.6 g/L; cell count: 6×10^6/L; negative SARS-CoV-2 on RT-PCR	Day 7; demyelinating pattern with motor and sensitive decreased conduction velocities and conduction blocks	Not performed	Day 4; IVIg (2 g/kg); slow progressive improvement

Abbreviations: COVID-19 = coronavirus disease 2019; GBS = Guillain-Barré syndrome; IVIg = IV immunoglobulin infusions; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2.

paraesthesia. She was hospitalized for dyspnea and loss of ambulation 3 days later and was rapidly transferred to an intensive care unit for noninvasive ventilation for acute respiratory failure with hypercapnia. She was discharged from the intensive care unit 9 days later, without requiring invasive mechanical ventilation. Neurologic examination disclosed proximal lower-limb weakness (MRC 2/5), distal weakness (MRC 4/5), and diffuse areflexia.

At admission, C-reactive protein was slightly increased at 22 mg/L. Antigangliosides antibodies were negative. CSF results showed subnormal cell count (6×10^6/L), increased protein level (1.06 g/L), and negative SARS-CoV-2 on RT-PCR assay. CT of the chest showed moderate ground-glass opacities in both lungs (figure e-1, links.lww.com/NXI/A267). Nerve conductions studies at day 7 showed a typical demyelinating pattern with a conduction block in the left median nerve, temporal dispersion, upper limb increased motor distal latencies, diffuse decreased motor and sensory conduction velocities lower than 38 m/s in 9 nerves of 10 tested (table e-1, links.lww.com/NXI/A267), and neurogenic pattern on EMG. IVIg (2 g/kg) were started at day 4 after the onset of the first neurologic symptoms. Left peripheral facial palsy occurred in a delayed manner at day 9. Her clinical condition improved slowly with physiotherapy, needing a transfer in a rehabilitation center.

We reported here 2 cases of GBS related to SARS-CoV-2 infection with neurologic improvement on IVIg, adding to few cases of GBS, one case of Miller Fisher syndrome, and one case of polyneuritis cranialis already published.

The first case report described a patient with GBS whose symptoms began 7 days before COVID-19, which asks the question of parainfectious profile or coincidence.[3] However, previous reports and our cases suggest that GBS associated with SARS-CoV-2 infection could start between 5 and 21 days after the SARS-CoV-2 clinical symptoms.[4] It could follow a postinfectious profile as reported on Middle East respiratory syndrome coronavirus infection in 4 patients with Bickerstaff's encephalitis overlapping with GBS.[5]

Thus, our cases add to several other reported cases and strengthen the view that GBS occurs with COVID-19.

Study funding

No targeted funding reported.

Disclosure

K. Bigaut, M. Mallaret, S. Baloglu, B. Nemoz, P. Morand, F. Baicry, A. Godon, P. Voulleminot, L. Kremer, J.-B. Chanson, and J. de Seze report no disclosures relevant to the manuscript. Go to Neurology.org/NN for full disclosures.

Publication history

Received by *Neurology: Neuroimmunology & Neuroinflammation* April 29, 2020. Accepted in final form May 6, 2020.

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Name	Location	Contribution
Kévin Bigaut, MD	Service de Neurologie, Hôpitaux Universitaires de Strasbourg, France	Conception, organization and execution of the research project, and writing of the first draft and the review and critique of the manuscript
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Neurol Neuroimmunol Neuroinflamm 2020;7;
DOI 10.1212/NXI.0000000000000785

CORRECTION

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Neurol Neuroimmunol Neuroinflamm 2020;7:e850. doi:10.1212/NXI.0000000000000850

In the Article "Guillain-Barré syndrome related to SARS-CoV-2 infection" by K. Bigaut et al.,[1] there are several errors in table 1. The age noted for the patient described in the first case should be 43; additionally, the protein level in CSF should be listed as 0.94 g/L for this patient. Lastly, for the patient described in the second case, the protein level in CSF should be listed as 1.06 g/L. The authors regret the errors.

Reference

1. Bigaut K, Mallaret M, Baloglu S, et al. Guillain-Barré syndrome related to SARS-CoV-2 infection. Neurol Neuroimmunol Neuroinflamm 2020;7:e785. doi:10.1212/NXI.0000000000000785.