Post-COVID-19 bifacial weakness and paraesthesia: a case report

Johann Stuby1, René Roth2, Nico Streckert2, Jonas Teubner2, Alain Rudiger2

1 Internal Medicine, Limmattal Hospital Zurich, Schlieren, Switzerland
2 Neurology, Limmattal Hospital Zurich, Schlieren, Switzerland

Summary

OBJECTIVES: We present a patient with bifacial weakness and paraesthesia subtype of Guillain-Barré syndrome (GBS), which occurred 1 month after a SARS-CoV-2 infection. While GBS as complication of SARS-CoV-2 infection has been described many times, only a few cases of post-COVID-19 bifacial weakness and paraesthesia are known to date.

RESULTS: A 59-year-old man presented with thoracic-radicular pain, paraesthesias of hands and feet, as well as progressive bilateral facial palsy. Neurological examination revealed a hyporeflexia of his lower limbs and hypoesthesia of his hands and feet. Clinical and electrophysiological findings as well as CSF analysis were consistent with bifacial weakness and paraesthesia. The patient’s condition improved promptly after 5 days of intravenous immunoglobulin therapy.

DISCUSSION: We suspect bifacial weakness and paraesthesia to be a possible post-infectious complication of COVID-19. Hence, it is a differential diagnosis of facial nerve palsy in association with SARS-CoV-2 infection. Considering the rarity of GBS and bifacial weakness and paraesthesia, it appears unlikely that bigger trials elucidated the causal relation between them and SARS-CoV-2 infection will be available in the future.

Introduction

Coronavirus disease 2019 (COVID-19), mainly a respiratory infection, can lead to long-term health issues even after primary recovery. Next to cardiovascular events, neurological complications add substantially to the morbidity and mortality. While GBS as known complication of SARS-CoV-2 infection, only few cases of post COVID-19 bifacial weakness and paraesthesia (BFP) have been reported [1, 2]. We present a case of the BFP subtype of Guillain-Barré syndrome (GBS) that developed 1 month after infection with SARS-CoV-2.

Case description

A 59-year-old man presented to the emergency room with a 1–week history of progressive chest and back pain resistant to non-opioid and opioid analgesics. Other than hypothyroidism and hypercholesterolaemia, for which he was taking levothyroxine and ezetimibe, his medical history was unremarkable. The reported pain radiated symmetrically from the thoracic spine to the ribs along T3 to T6. Furthermore, he reported burning sensations in his hands and feet. One month earlier, he had been hospitalised for severe, but non-critical COVID-19 (according to World Health Organization Therapeutics and COVID-19: living guideline [3]). His symptoms had been fever, frailty, cough and dyspnoea. Signs of neurological involvement had not been present. He received supplemental oxygen delivered by nasal cannula, as well as intravenously administered remdesivir, amoxicillin/clavulanic acid and clarithromycin.

At the current presentation, neurological examination revealed hyporeflexia of his lower limbs as well as hypoesthesia of his hands and feet. Laboratory tests (high-sensitive troponin T, creatine kinase) and an electrocardiogram excluded myocardial infarction. Computed tomography of his chest did not show any signs of pulmonary embolism, aortic dissection or Boerhaave’s syndrome. Magnetic resonance imaging found no myelopathy, spinal stenosis or disc herniation (data not shown). Following the clinical suspicion of polyradiculoneuropathy, an electroneurogram was performed, which demonstrated signs of demyelination in the lower limbs (presence of complex A-waves in left tibial nerve, fig. 1).

Serology for Borrelia burgdorferi (IgM, IgG), Treponema pallidum and human immunodeficiency virus (antibodies and p24 antigen) infection, as well as anti-ganglioside antibodies (anti-GM1 IgG, anti-GM2 IgG, anti-GD1a IgG, anti-GD1b, a-GQ1b IgG, anti-GM1 IgM, anti-GM2 IgM, anti-GD1a IgM, anti-GD1b IgM, anti-GQ1b IgM) were negative. Vitamin B12, folate, electrolytes, creatinine, liver function tests, anti-GD1a, anti-GD1b, anti-GQ1b antibodies (anti-GM1 IgG, anti-GM2 IgG, anti-GD1a IgG, anti-GD1b, a-GQ1b IgG, anti-GM1 IgM, anti-GM2 IgM, anti-GD1a IgM, anti-GD1b IgM, anti-GQ1b IgM) were negative. Vitamin B12, folate, electrolytes, creatinine, liver function tests, glycate haemoglobin and thyroid stimulating hormone were within normal ranges (data not shown). Lumbar puncture for cerebrospinal fluid (CSF) analysis revealed albuminocytological dissociation with borderline pleocytosis of 5/μl (100% mononuclear) leucocytes (normal <5/μl) and protein levels of 1901 mg/l (normal 150–450 mg/l). CSF polymerase chain reaction assays for herpes simplex virus type 1 and type 2 were negative (data not shown). On day four after admission, the patient complained of burning sensations of the tongue;
later the same day he presented with a progressive bilateral facial palsy. Blink reflex demonstrated prolonged latencies of R1 of both eyes as well as prolonged latencies of ipsilateral R2 and contralateral R2 of the right eye and not measurable R2 latency of the left eye (fig. 2).

These findings were in line with a demyelinating process. Diagnosis of GBS subtype BFP was made. Paralysis of the extremities or respiratory muscles was not present at any time. An anti-inflammatory medication with intravenous immunoglobulins at a dose of 0.4 g/kg for 5 days and analgesic treatment with pregabalin and amitriptyline was initiated. The patient’s condition improved promptly. At 1-month follow-up, only minor paraesthesia of hands and feet persisted, while bilateral weakness as well as chest and back pain had completely resolved. A follow-up ENG did not show significant differences. A visual representation of events can be found in figure 3.

Discussion

We report a patient with thoracoradicular pain, paraesthesia of the hands and feet, as well as progressive bilateral facial palsy 1 month after COVID-19. According to the diagnostic criteria of BFP [4], clinical and electrophysiological findings together with CSF analysis were consistent with the bilateral weakness and paraesthesia subtype of Guillain-Barré syndrome.

Beside the classic sensorimotor form of GBS with ascending weakness, areflexia and sensory deficits, various subtypes such as Miller Fisher syndrome, Bickerstaff brainstem encephalitis, pharyngeal-cervical-brachial palsy are possible clinical manifestations. The incidence of bilateral facial palsy is about 1 per 5,000,000 population [5] and GBS is just one possibly aeology, whereof BFP is a rare subtype. BFP is defined by rapidly progressive bilateral facial weakness, distal limb paraesthesia and hyporeflexia/areflexia, while other cranial neuropathies, ataxia, or limb weakness are absent [4]. In BFP, anti-ganglioside IgG antibodies are usually not present. Nevertheless, testing for anti-ganglioside antibodies can be helpful to exclude alternative diagnoses of facial weakness, such as Miller Fisher syndrome or pharyngeal-cervical-brachial weakness [4]. Given the lack of anti-ganglioside antibodies, ophthalmoplegia and ataxia in our patient, we suspected BFP and not the Miller Fisher subtype of GBS [6].

Viral (e.g., influenza A virus, cytomegalovirus, Epstein-Barr virus, MERS-CoV) and bacterial (e.g., Campylobacter jejuni, Mycoplasma pneumoniae, Haemophilus influenzae) infections are frequent antecedents of GBS [7, 8]. Due to molecular mimicry, post-infectious antibodies cross-react with neuronal antigens, causing demyelination and/or axonal damage [1]. Various case reports have been published hypothesising an induction of GBS by SARS-CoV-2 [9, 10]. Whether there is an increase of GBS incidence during COVID-19 pandemic is currently controversial [11–13]. Common neurological symptoms of COVID-19 such as hypogeusia and hyposmia seem to reflect a direct viral infiltration of the nervous system, whereas GBS is more likely to be triggered by autoimmunity as described for other pathogens above [8, 9]. In a systematic review of 73 cases, SARS-CoV-2 RNA in the CSF was absent in all tested patients [9]. This fea-
ture, together with the latency of neurological symptoms after COVID-19 (median 14 days) and clinical improvement after intravenous immunoglobulin therapy contribute to the theory of an immune-mediated mechanism of post COVID-19 GBS.

In the case by Hutchins et al. [1], a patient developed BFP in temporal relationship to antecedent SARS-CoV-2 infection (16 days after onset of COVID-19 symptomatology), but positive herpes simplex virus serology raised the question of causality. BFP has been described as a post infectious complication of COVID-19 in another case report [2], in which a pregnant woman with SARS-CoV-2 infection 6 weeks previously presented with rapidly progressive bilateral facial palsy, extremity paraesthesia, and right vestibulocochlear neuritis. In line with our findings, facial palsy rapidly resolved after intravenous immunoglobulin therapy, whereas paraesthesia was still present at 2-week follow-up.

Inherent to the clinical nature of a case report, we can only speculate about the causality of COVID-19 and BFP in our patient, and cannot provide evidence that SARS-CoV-2 was truly responsible. However, given that GBS is a known rare after-effect of viral infections, it seems highly plausible that SARS-CoV-2 can be a trigger. Other aetiologies such as drugs or subclinical diseases cannot be ruled out. Potential associations between an antibiotic therapy with fluoroquinolones or penicillin and the development of GBS have been described, but no definite cause-effect relationships have been established [14, 15].

Considering the rarity of GBS and especially the BFP subtype, it appears to be very unlikely that bigger trials elucidating the causal relation between BFP and COVID-19...

**Figure 2:** Asymmetric, bilateral pathological blink reflex suggestive of peripheral demyelination and partial interruption of the polysynaptic trigeminal-facial reflex. Prolonged R1 latency on both sides (15.3 ms right, 15.1 ms left; normal <12.1 ms), prolonged R2 latencies on the right side (39.8 ms right, 44.6 ms left; normal <37.3 ms) and missing R2 response on the left side. R1 is a response due to a disynaptic pathway between the ipsilateral principal sensory nucleus of trigeminal nerve and the ipsilateral facial motor nucleus. R2 is a response due to a multisynaptic pathway between the ipsilateral spinal trigeminal nucleus and interneurons to the ipsilateral and contralateral facial motor nucleus.
will be available in the future. Hence advancing medical scientific knowledge through case reports seems the most appropriate way.

Conclusion

GBS and its subtype BFP are potential postinfectious immune-mediated complications of SARS-CoV-2 infection. Diagnosis is based on clinical features, electrophysiological assessment and CSF analysis. When it is treated with intravenous immunoglobulins, the outcome is favourable. Physicians must be aware of rare COVID-19-related immune-mediated disorders. BFP is an important differential diagnosis of facial nerve palsy in association with SARS-CoV-2 infection.

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Conflict of interest statement

The authors declare no conflicts of interest.

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References
