Guillain-Barré syndrome associated with SARS-CoV-2 infection: causality or coincidence?

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), originating from Wuhan, is spreading around the world and the outbreak continues to escalate. Patients with coronavirus disease 2019 (COVID-19) typically present with fever and respiratory illness.[1] However, little information is available on the neurological manifestations of COVID-19. Here, we report the first case of COVID-19 initially presenting with acute Guillain-Barré syndrome.

On Jan 23, 2020, a woman aged 61 years presented with acute weakness in both legs and severe fatigue, progressing within 1 day. She returned from Wuhan on Jan 19, but denied fever, cough, chest pain, or diarrhoea. Her body temperature was 36·5°C, oxygen saturation was 99% on room air, and respiratory rate was 16 breaths per min. Lung auscultation showed no abnormalities. Neurological examination disclosed symmetric weakness (Medical Research Council grade 4/5) and areflexia in both legs and feet. 3 days after admission, her symptoms progressed. Muscle strength was grade 4/5 in both arms and hands and 3/5 in both legs and feet. Sensation to light touch and pinprick was decreased distally.

Laboratory results on admission were clinically significant for lymphocytopenia ($0{\cdot}52 \times 10^9$/L, normal: $1{\cdot}1–3{\cdot}2 \times 10^9$/L) and thrombocytopenia (113×10^9/L, normal: $125–300 \times 10^9$/L). CSF testing (day 4) showed normal cell counts (5×10^6/L, normal: $0–8 \times 10^6$/L) and increased protein level (124 mg/dL, normal: 8–43 mg/dL). Nerve conduction studies (day 5) showed delayed distal latencies and absent F waves in early course, supporting demyelinating neuropathy (tables 1, 2). She was diagnosed with Guillain-Barré syndrome and given intravenous immunoglobulin. On day 8 (Jan 30), the patient developed dry cough and a fever of 38·2°C. Chest CT showed ground-glass opacities in both lungs. Oropharyngeal swabs were positive for SARS-CoV-2 on RT-PCR assay. She was immediately transferred to the infection isolation room and received supportive care and antiviral drugs of arbidol, lopinavir, and ritonavir. Her clinical condition improved gradually and her lymphocyte and thrombocyte counts normalised on day 20. At discharge on day 30, she had normal muscle strength in both arms and legs and return of tendon reflexes in both legs and feet. Her respiratory symptoms resolved as well. Oropharyngeal swab tests for SARS-CoV-2 were negative.

On Feb 5, two relatives of the patient, who had taken care of her during her hospital stay since Jan 24, tested positive for SARS-CoV-2 and were treated in isolation. Relative 1 developed fever and cough on Feb 6, and relative 2 developed fatigue and mild cough on Feb 8. Both relatives had lymphocytopenia and radiological abnormalities. In the neurology department, a total of eight close contacts (including two neurologists and six nurses) were isolated for clinical monitoring. They had no signs or symptoms of infection and tested negative for SARS-CoV-2.

To the best of our knowledge, this is the first case of SARS-CoV-2 infection associated with Guillain-Barré syndrome. Given the patient's travel history to Wuhan, where outbreaks of SARS-CoV-2 were occurring, she was probably infected during her stay in Wuhan. We consider that the virus was transmitted to her relatives during her hospital stay. Retrospectively, the patient's initial laboratory abnormalities (lymphocytopenia and thrombocytopenia), which were consistent with clinical characteristics of patients with COVID-19,[2] indicated the presence of SARS-CoV-2 infection on admission. The early presentation of COVID-19 can be non-specific (fever in only 43·8% of patients on admission[2]). Considering the temporal association, we speculate that SARS-CoV-2 infection might have been responsible for the development of Guillain-Barré syndrome in this patient. Furthermore, the onset of Guillain-Barré syndrome symptoms in this patient overlapped with the

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	Distal latency, ms	Amplitude, mV	Conduction velocity, m/s	F latency, ms
Left median nerve				
Wrist–abductor pollicis brevis	3·77 (normal ≤3·8)	5·90 (normal ≥4)	..	..
Antecubital fossa–wrist	7·96	5·70	51 (normal ≥50)	..
Left ulnar nerve				
Wrist-abductor digiti minimi	3·04 (normal ≤3·0)	6·60 (normal ≥6)	..	Absent F (normal ≤31)
Below elbow–wrist	6·54	6·80	56 (normal ≥50)	..
Above elbow–below elbow	8·29	6·60	57	..
Left tibial nerve				
Ankle-abductor hallucis brevis	7·81 (normal ≤5·1)	7·30 (normal ≥4)	..	Absent F (normal ≤56)
Popliteal fossa–ankle	17·11	4·80	43 (normal ≥40)	..
Right tibial nerve				
Ankle-abductor hallucis brevis	6·65 (normal ≤5·1)	8·00 (normal ≥4)	..	Absent F (normal ≤56)
Popliteal fossa–ankle	15·95	6·00	43 (normal ≥40)	..
Left peroneal nerve				
Ankle-extensor digitorum brevis	5·21 (normal ≤5·5)	1·87 (normal ≥2)	..	..
Below fibula–ankle	12·50	1·49	43 (normal ≥42)	..
Right peroneal nerve				
Ankle–extensor digitorum brevis	11·30 (normal ≤5·5)	2·90 (normal ≥2)	..	..
Below fibula–ankle	18·20	2·70	43 (normal ≥42)	..

Table 1: **Motor nerve conduction studies**

	Amplitude, μV	Conduction velocity, m/s
Left median nerve		
Digit 2–wrist	15·9 (normal ≥18)	68 (normal ≥50)
Left ulnar nerve		
Digit 5–wrist	16·4 (normal ≥18)	61 (normal ≥50)
Left superficial fibular nerve		
Lateral calf–lateral ankle	13·0 (normal ≥6)	52 (normal ≥40)
Right superficial fibular nerve		
Lateral calf–lateral ankle	10·8 (normal ≥6)	55 (normal ≥40)
Left sural nerve		
Calf–posterior ankle	15·9 (normal ≥6)	53 (normal ≥40)
Right sural nerve		
Calf–posterior ankle	15·6 (normal ≥6)	49 (normal ≥40)

***Table* 2: Antidromic sensory nerve conduction studies**

See Online for appendix

period of SARS-CoV-2 infection. Hence Guillain-Barré syndrome associated with SARS-CoV-2 might follow the pattern of a parainfectious profile, instead of the classic postinfectious profile, as reported in Guillain-Barré syndrome associated with Zika virus.[3,4]

However, the limitation of this case is absence of microbiological testing on admission. Besides, the patient's fever and respiratory symptoms developed 7 days after the onset of Guillain-Barré syndrome symptoms. Therefore, it is prudent to consider the alternative explanation that the patient coincidentally developed Guillain-Barré syndrome of unknown cause and acquired SARS-CoV-2 infection nosocomially; although, there was no report of COVID-19 in the neurological ward during her stay nor in her close contacts (except for her two relatives).

Overall, this single case report only suggests a possible association between Guillain-Barré syndrome and SARS-CoV-2 infection, and more cases with epidemiological data are necessary to support a causal relationship. This case also suggests the need to consider potential neurological symptoms of SARS-CoV-2 infection. Furthermore, this report should alert clinicians to the risk of inadvertent SARS-CoV-2 infection, even if they work outside of the emergency or infectious disease department.

We declare no competing interests.

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