LETTER TO THE EDITORS

Acute inflammatory demyelinating polyneuritis in association with an asymptomatic infection by SARS-CoV-2

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Dear Sirs,

After the recognition of COVID-19 disease, caused by the SARS-CoV-2, several reports refer to neurological symptoms in such patients [1, 2], including Guillain–Barré Syndrome (GBS) [3–9].

We describe a case of acute demyelinating polyneuritis in association with asymptomatic SARS-CoV-2 infection.

A 66-years old Moroccan woman, the resident in the Bologna area, was admitted to Imola Hospital on March 15th, 2020, for hyposthenia in all limbs, severe in lower, with a Medical Research Council (MRC) scale of 1/5 in distal and 2/5 in proximal of the lower extremities and 3/5 in distal and 4/5 in proximal of the upper extremities, with a distal tingling sensation and pronounced lumbar pain for about eight days. She was unable to walk, reported difficulty in swallowing and speaking, tendon reflexes were abolished. Vital signs were normal, medical history was negative and no infection was reported in the previous month.

We hypothesized GBS and performed nerve conduction studies consistent with demyelinating polyneuropathy (Tables 1, 2) and cerebrospinal fluid (CSF) analysis, consistent with our hypothesis (protein content 245 mg/dL, cells 13/mmcc, polymorphonucleate 61.5%).

Microbiologic testing on CSF and serum was negative (HSV1-2, EBV, VZV, CMV, HIV, Mycoplasma Pneumoniae, Borrelia). Anti-ganglioside antibodies were negative. We excluded electrolytic abnormalities, heavy metal or drugs toxicity, endocrinological disorders, folate and vitamin B12 deficiency.

Blood analysis showed elevated CPK (461 U/L, normal < 145), CRP (5.65 mg/dL, normal < 0.5), lymphocytopenia (0.68 × 10⁹/L, normal 1.10–4), mild increase of LDH (284 U/L, normal < 248), GOT and GPT (549 and 547 U/L, normal < 35), similarly to COVID-19 patients laboratory profile [10].

Thus, considering the rapid spread of this infection in our region and its pandemic extent, we decided to perform a RT-PCR for SARS-CoV-2 on nasopharyngeal swab, which resulted positive.

We found elevation of Interleukin 6 (11 pg/mL, normal < 5.9), also associated with Covid-19 disease [10]. She was transferred to Covid-19 department and received a five days course of intravenous immune globulin (IvIg), ritonavir 100 mg and darunavir 800 mg per day with hydroxychloroquine 200 mg per day with hydroxychloroquine 200 mg per day, according to our hospital protocol for COVID-19 treatment. She never developed respiratory symptoms or fever; thoracic CT scan was normal.

Immediately after IvIg, she significantly improved with a MRC scale of 4/5 in distal of upper limbs and 3/5 both proximal and distal in lower limbs, while facial diplegia has developed.

About 3 weeks after the onset of neurological symptoms two nasopharyngeal swabs, 24 hours apart, resulted negative and she was transferred to rehabilitation care.

To our knowledge, this is the first case of GBS in patient with asymptomatic COVID-19 and laboratory tests consistent with SARS-COV-2 infection. We think the infection wasn’t nosocomial, although we cannot absolutely exclude it, because the swab was performed within twelve hours from hospitalization and isolation protocols of suspected patients had been applied. Patient’s relatives did not develop symptoms but were observed in isolation for 2 weeks.

The association between COVID-19 and GBS has recently been described both as parainfectious [3, 7, 8] and

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as post-infective event [4, 5, 9], similar to other infections and coronavirus [11, 12], suggesting a mechanism of molecular mimicry or part of systemic inflammatory cascade triggered by the virus. Facial diplegia seems recurrent in GBS related to COVID-19 [7, 8].

Interesting in our case a patient asymptomatic for COVID-19 develops neurological impairment as a unique clinical event, probably as part of dysimmune process. Unfortunately, we could not perform a serological test or CSF PCR for COVID-19.

We believe this association may not be a coincidence, more cases could be evaluated, possibly supported by serological and CSF tests, and underlines the importance of looking for neurological impairment in COVID-19 disease and address the correct treatment, such as IvIg, also for respiratory function worsening independently from pneumonitis.

**Author contributions** BM treated the patient and collected the clinical information, BM, NI and PDM drafted the manuscript. BM and PDM performed the NCS analysis. PDM provided guidance for the diagnosis and clinical management of the patient. All authors contributed to the editing of the manuscript and approved the final version.

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### Table 1 Antidromic sensory nerve conduction studies

|                      | Amplitude, µV | Conduction velocity, m/s |
|----------------------|---------------|--------------------------|
| Left Median (digit 3-wrist) | 0·4 (n.v. ≥ 17) | 32·5 (n.v. ≥ 50)         |
| Left Ulnar (digit 5-wrist)   | Absent        | –                        |
| Right Sup. Peroneal (lateral calf-lateral ankle) | 1·2 (n.v. ≥ 6) | 50·0 (n.v. ≥ 40)         |
| Right Sural (calf-posterior ankle) | 1·6 (n.v. ≥ 6) | 58·3 (n.v. ≥ 40)         |
| Left Sural (calf-posterior ankle) | 1·8 (n.v. ≥ 6) | 48·1 (n.v. ≥ 40)         |

### Table 2 Motor nerve conduction studies

|                      | Distal Latency, ms | Amplitude, mV | Conduction velocity, m/s | F latency, ms | cMAP Duration, ms |
|----------------------|--------------------|---------------|--------------------------|--------------|-------------------|
| **Left Median**      |                    |               |                          |              |                   |
| Wrist-APB            | 9·9 (n.v ≤ 4·4)    | 2·6 (n.v. ≥ 4·4) | 45·5 (n.v. ≤ 31)         | 21·4         |
| Antecub. fossa-wrist | 13·3               | 2·6           | 57·4 (n.v. ≥ 50)         |              |
| **Left Ulnar**       |                    |               |                          |              |                   |
| Wrist-ADM            | 6·2 (n.v. ≤ 3·3)   | 2·5 (n.v. ≥ 6·0) | 41·5 (n.v. ≤ 32)         | 33·1         |
| Below elbow-wrist    | 11                 | 1·7           | 39·6 (n.v. ≥ 50)         |              |
| Ab.elbow-bel.elbow   | 15·4               | 1·4           | 36·4                     |              |
| **Left Tibial**      |                    |               |                          |              |                   |
| Ankle-AHB            | 12·8 (n.v. ≤ 5·8)  | 1·8 (n.v. ≥ 4·0) | Absent (n.v. ≤ 56)       | 38·2         |
| Popliteal fossa-ankle| 23·8               | 1·3           | 34·1 (n.v. ≥ 41)         |              |
| **Right Tibial**     |                    |               |                          |              |                   |
| Ankle-AHB            | 11·3 (n.v. ≤ 5·8)  | 1·1 (n.v. ≥ 4·0) | Absent (n.v. ≤ 56)       | 42·7         |
| Popliteal fossa-ankle| 18·9               | 1·0           | 48·7 (n.v. ≥ 41)         |              |
| **Left Peroneal**    |                    |               |                          |              |                   |
| Ankle-EBD            | 14·3 (n.v ≤ 0·1)   | 0·1 (n.v. ≥ 2·0) | Absent (n.v. ≤ 56)       | 30·8         |
| Bel.fibula-ankle     | 22·8               | 0·4           | 30·6 (n.v. ≥ 41)         |              |
| Ab.fibula-bel.fibula | 26·1               | 0·5           | 30·3                     |              |
| **Right Peroneal**   |                    |               |                          |              |                   |
| Ankle-EBD            | 7·4 (n.v ≤ 0·1)    | 3·0 (n.v. ≥ 2·0) | Absent (n.v. ≤ 56)       | 19·8         |
| Bel.fibula-ankle     | 16                 | 1·8           | 30·2 (n.v. ≥ 41)         |              |
| Ab.fibula-bel.fibula | 19                 | 1·8           | 28·9                     |              |

Distal compound muscle action potentials (cMAP) showed reduced amplitude because of temporal dispersion due to demyelination.

*APB* abductor pollicis brevis, *ADM* abductor digiti minimi, *AHB* abductor hallucis brevis, *EBD* extensor digitorum brevis, *n.v.* normal value.
Compliance with ethical standards

Conflicts of interest The authors declare no conflicts of interest relevant to the manuscript.

Ethical approval This article does not contain any studies involving human participant performed by any of the Authors

Informed consent Written informed consent was collected from the patient for the inclusion of de-identified clinical data in a scientific publication, in accordance with the Declaration of Helsinki.

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