



Facial nerve palsy: an atypical clinical manifestation of COVID-19 infection in a family cluster

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Introduction

Typical clinical manifestations related to COVID-19 include fever, fatigue and respiratory syndrome. However, an increasing number of reports of neurological manifestations have emerged [1]. The case of a 57-year-old woman referred early April 2020 to the neurology inpatient ward because of acute left-side facial nerve palsy noticed upon awakening is reported.

Case report

Our patient's medical history was unremarkable besides being overweight (body mass index 27.7 kg/m²). Neurological examination revealed left weakness of the upper and the lower face and Bell's phenomenon. She had no hyperacusis, no vesicles in the outer ear and no parotid swelling. Corneal reflex was present. The rest of the neurological examination was normal (motor, sensory, other cranial nerves, osteotendinous reflexes). The remainder of her physical examination was unremarkable.

A detailed medical history revealed that she had presented 7 days before with fatigue, muscular pain and moderate cough of 3 days' duration. She did not report fever but had chills. In the context of the pandemic, COVID-19 was immediately suspected as a possible diagnosis. It was confirmed by nasopharyngeal and tracheal real-time reverse transcription polymerase chain reaction assays (RT-PCR). Chest radiography showed infiltrates. Using appropriate protective measures, further investigations were undertaken. Results are outlined in Table 1. The RT-PCR for SARS-CoV-2 was negative in cerebrospinal fluid (CSF). She received the usual symptomatic treatment of facial nerve palsy (e.g. ocular protection), although oral corticosteroids were omitted due to the COVID-19 infection. She was subsequently transferred to a dedicated COVID-19 unit for further

observation. On the third day of hospitalization, she developed hypoxemia and required 24-h oxygen support. One month later, she had completely recovered from both neurological and respiratory conditions.

It was notable that our patient had been visiting her mother regularly 2 weeks prior to the onset of her symptoms. Her 84-year-old mother had been admitted to the geriatric COVID-19 unit 1 week earlier due to intractable diarrhea and deconditioning (see timeline in Fig. 1). She was frail and had a long list of comorbidities, such as mild cognitive impairment, chronic skin sores, obesity, falls, arthritis and depression. Prior to the hospitalization, her mother had remained in a rehabilitation center for 2 months, until discharge following a negative swab for SARS-CoV-2 that she had due to a systematic screening. The diagnosis of COVID-19 for her mother was finally confirmed in the geriatric unit by nasopharyngeal and feces RT-PCR assays.

Discussion

Our case report supports isolated cranial nerve deficit, especially facial nerve palsy, as a possible neurological manifestation due to COVID-19 infection. Facial nerve palsy is known to be associated with various viral infectious agents, including herpes simplex, varicella zoster and human immunodeficiency viruses. Additionally, coronavirus-related neurotropism has been reported [2]. In the case of COVID-19, putative mechanisms of the broad range of neurological manifestations are still unclear [3]. As with our patient, in these cases, CSF analyses were negative or under the threshold of detection using the RT-PCR assay, thus arguing against direct viral toxicity. It is worth noting that, even in cases of meningitis or encephalitis, RT-PCR for SARS-CoV-2 in CSF was nearly always negative [4]. As immune-mediated mechanisms are involved in several systemic injuries due to COVID-19, it is possible that such mechanisms account for cranial nerve deficits as well. The delay of about 7–10 days before the onset of neurological symptoms, which seems to be typical, supports this hypothesis [2]. Cranial nerve

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Table 1 Main results of paraclinical investigations

Examination	Delay from first clinical COVID-19 manifestation	Delay from first neurological COVID-19 manifestation	Main results
Blood sample	7 days	0 day	Ganglioside antibodies: negative Nuclear antibodies panel: negative Rheumatoid factor: normal Classical complement pathway: normal Converting angiotensin enzyme: normal <i>Campylobacter jejuni</i> serology: negative HIV serology: negative HAV serology: negative HBV serology: negative HCV serology: negative CMV serology: acquired immunity VZV serology: acquired immunity EBV serology: acquired immunity TPHA-VDRL: negative Lyme disease serology: negative
Lumbar puncture for cerebrospinal fluid (CSF)	8 days	1 day	Pleocytosis: none Protein level: normal Glucose level: normal Oligoclonal bands: negative RT-PCR SARS-CoV-2: negative
Electroneuromyography	8 days	1 day	Blink reflex: left, absence; right, normal Signs of neuropathic demyelination or axonal damage: no abnormality F-waves: present Sensory nerve potential action: absence
Brain magnetic resonance imaging	8 days	1 day	Normal No enhancement of the left facial nerve

CMV, cytomegalovirus; EBV, epstein-barr virus; HAV, hepatitis A virus; HBV, hepatitis B virus; HCV, hepatitis C virus; HIV, human immunodeficiency virus; RT-PCR SARS-CoV-2; reverse transcription polymerase chain reaction assay for severe acute respiratory syndrome coronavirus 2; TPHA, treponema pallidum haemagglutination assay; VDRL, venereal disease research laboratory; VZV: varicella-zoster virus.

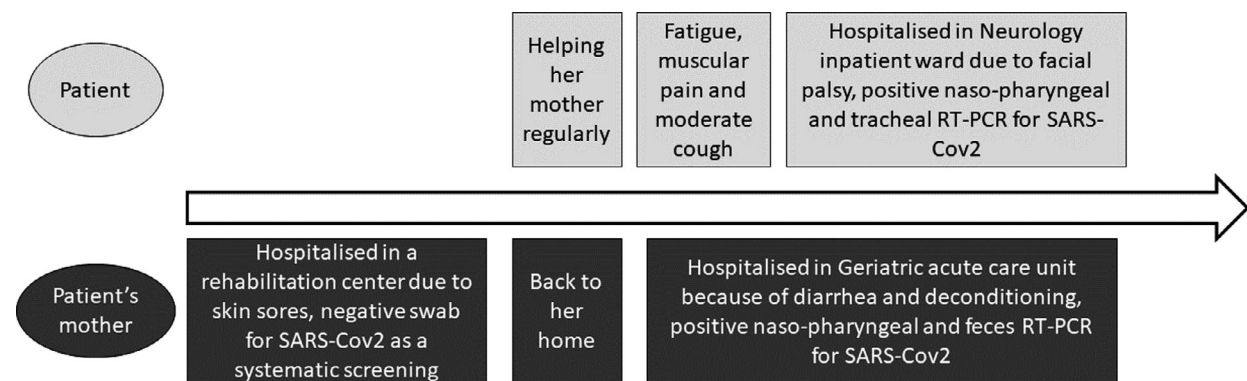


Figure 1 Timeline of different manifestations.

involvement has been described in the context of Guillain-Barré syndrome [5] and its variants [6–8]. Descriptions of isolated cranial nerve involvement in the context of COVID-19 are scarce [9].

Moreover, typical respiratory manifestations of COVID-19 were also absent in our patient’s mother, as is often observed in frail older people [10]. This

suggests that due to the high contagiousness and ongoing global pandemic caused by COVID-19, careful physical examinations and medical histories should be performed in order to avoid diagnostic delays and further transmission of the virus. Still, physicians will need to have a high index of suspicion for COVID-19. In particular, clinicians should be aware of atypical

presentations amongst frail and older people. Preventive measures during medical investigations and social isolation of relatives and contact cases are key strategies to arrest the spread of the pandemic. Furthermore, since many unanswered questions about the exact mechanisms underlying neurological manifestations due to COVID-19 remain, more reports of cases and case definitions are needed to further our understanding [11,12].

Disclosure of conflicts of interest

Dr Céline Derollez reports no disclosures. Tifanie Alberto reports no disclosures. Pr Iracema Leroi reports no disclosures. Dr Marie-Anne Mackowiak reports no disclosures. Dr Yaohua Chen reports no disclosures.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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