

## Case report

## Peripheral facial paralysis as presenting symptom of COVID-19 in a pregnant woman

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**SUMMARY**

Acute facial nerve disease leading to peripheral facial paralysis is commonly associated with viral infections. COVID-19 may be a potential cause of peripheral facial paralysis and neurological symptoms could be the first and only manifestation of the disease. We report a case of a term pregnancy diagnosed with COVID-19 after presenting with isolated peripheral facial palsy.

**BACKGROUND**

Acute facial nerve disease leading to peripheral facial paralysis is associated with viral infections.<sup>1</sup> COVID-19 is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and respiratory symptoms are the main clinical features.<sup>2</sup> Although neurological complications of COVID-19 are seldom described, recent papers reported neurologic symptoms related to this infection.<sup>3–5</sup> To our knowledge, no other cases of isolated neurologic presentation have been described with this virus. We report a case of a term pregnancy diagnosed with COVID-19 after presenting with isolated peripheral facial palsy.

**CASE PRESENTATION**

A 35-year-old woman, primigravida, 39-week gestation, presented to the obstetric emergency department with a 2-day onset of progressive left-side labial commissure deviation. No history of chronic hypertension, diabetes, overweight or immunosuppression was recorded. At physical examination, she had involuntary drooling, left-side labial commissure deviation and ipsilateral lagophthalmos. She had no other symptoms, including fever, dyspnoea, odynophagia, ear pain, dermatomal pain, face swelling, skin rash, cough, myalgias, anosmia, ageusia or diplopia. No recent history of respiratory infection or SARS-CoV-2 epidemiologic context was reported. No history of tick bite or recent trauma was described. On neurological examination, she exhibited left peripheral facial palsy. The remaining exam revealed no abnormalities, including signs of other cranial neuropathies or limb weakness. No vesicles in the external ear were observed and otoscopy was unremarkable.

Laboratory results on admission were significant for mild leucocytosis ( $1,25 \times 10^9$  cells/L), with relative lymphopenia (15.2%;  $1,92 \times 10^9$  cells/L) and relative neutrophilia (73.3%;  $9,19 \times 10^9$  cells/L) as well as increased C-reactive protein level (61 mg/dL). Platelet count and liver enzymes were within normal values.

Probable Bell's palsy was assumed. Corticosteroid therapy (10-day tapering prednisolone course, starting at 60 mg/day) was initiated in order to optimise functional recovery. Eye hydration measures were also undertaken.

As she presented with regular uterine contractions, she was admitted in the labour ward. According to the universal screening protocol established in the department, a nasal swab for SARS-CoV-2 PCR test was performed. She tested positive for SARS-CoV-2; consequently, proper containment measures were implemented.

**OUTCOME AND FOLLOW-UP**

She had normal labour progression, without intrapartum fever, and delivered vaginally a 2870 g newborn with a 5-minute Apgar Score of 10. After careful counselling, the woman decided not to be separated from the newborn and started breastfeeding. During hospital stay, she was counselled to take all precautions in order to minimise possible contamination of the newborn. Newborn SARS-CoV-2 testing at birth and at 48 hours of life was negative. She started facial physiotherapy exercises, and 15 days after birth neurologic deficits slightly improved. She remained afebrile and without any respiratory symptoms.

**DISCUSSION**

We describe a case of facial peripheral paralysis in which SARS-CoV-2 infection was unexpectedly found. As stated before, although COVID-19 mainly causes respiratory symptoms, neurologic manifestations have also been described. A retrospective review reported neurological symptoms in 36.5% of patients.<sup>6</sup> In another cohort, the peripheral nerve system was involved in 8.9% of COVID-19 cases.<sup>7</sup>

SARS-CoV-2 is very similar in structure and infectious mechanism to other known coronaviruses (CoV). As neuroinvasive propensity is a common feature of CoV, it is quite likely that SARS-CoV-2 also possesses potential neurotropism,<sup>6,8</sup> possibly through direct neurological damage, as it has high affinity for ACE2 receptors, which are expressed in the nervous system.<sup>8–10</sup> ACE2 receptor is highly expressed in the nasal mucosa, particularly in the ciliated epithelium and goblet cells, where viral replication appears to be the greatest, as evidenced by the highest viral titers shed from the nose.<sup>11</sup> SARS-CoV-2 affects olfactory nerve and bulb, which provides a direct pathway to the central nervous system.<sup>12</sup>

Some case reports of acute demyelinating neuropathy secondary to a SARS-CoV-2-mediated immune



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## Unusual presentation of more common disease/injury

response conditioning Guillain-Barré syndrome were recently described.<sup>3 13 14</sup>

The prevalence of peripheral facial palsy is increased among pregnant women, particularly in the third trimester and in the first week following birth.<sup>15 16</sup> Physiological changes during pregnancy, such as a hypercoagulable state, increased cortisol levels, immunosuppression, increased total body water, changes in the levels of oestrogen and progesterone or conditions like hypertension, preeclampsia and impaired glucose tolerance, have been postulated to contribute to this susceptibility.<sup>16</sup> Moreover, the functional prognosis of peripheral facial palsy appears to be worse in pregnant women as the estimated recovery is 52% compared with 77%–88% in a non-pregnant age-matched population.<sup>17</sup> Hence the importance of early management with corticosteroids, as they decrease the incidence of permanent deficits. However, in view of the possible debuting of respiratory symptoms in the setting of COVID-19, this treatment could eventually worsen the respiratory scenario. As our patient had no respiratory symptoms and considering the short-term course of the treatment, it was decided to initiate corticotherapy, maintaining close observation for possible respiratory symptoms.

Due to involuntary drooling and the need to apply eye drops several times per day, the systematisation of hygiene measures, in order to minimise the risk of newborn infection, was an even greater challenge.

Other causes of acquired facial paralysis were considered. Regarding other infectious etiologies, the absence of skin and ear lesions and dermatomal pain made the diagnosis of varicella zoster virus and herpes virus infections unlikely. Also, Lyme disease was considered improbable due to its local low prevalence, associated with the lack of tick bite and skin rash history. HIV is a major worldwide cause of facial palsy, but was excluded by prenatal screening. Immunologic diseases such as vasculitis, sarcoidosis or other autoimmune diseases were unlikely as systemic involvement was not present. Neoplasm and cerebrovascular diseases should be considered in the presence of other neurologic deficits, which was not the case. Therefore, as the probability of alternative diagnosis was low, and considering the pandemic setting, the temporal association (positive test 2 days after the onset of symptoms) and the mild laboratory changes, we speculate that COVID-19 may be the potential cause of the peripheral facial paralysis. Thus, neurologic symptoms may be the first and only manifestation of this disease. We hypothesise that this potential highly unusual isolated presentation was magnified by the physiologic susceptibility of the pregnancy state. It is prudent to consider the alternative explanation that the patient coincidentally may have developed Bell's Palsy and acquired SARS-CoV-2 infection at the same period of time.

This single case report suggests a possible association between SARS-CoV-2 infection and Bell's Palsy. However, more cases with

epidemiological data are necessary to support a causal relationship. Exploring the neurologic manifestations of COVID-19 is essential towards better understanding of the virus. Therefore, further studies are needed to comprehend the natural history and prognostic significance of cranial neuropathies in SARS-CoV-2 infection and to determine the best management strategy.

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### Learning points

- ▶ COVID-19 may be a potential cause of peripheral facial paralysis.
- ▶ Neurological symptoms could be the first and only manifestation of the COVID-19.
- ▶ Pregnant women have higher susceptibility for peripheral facial palsy and functional prognosis can be worse.

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