

Coronavirus disease 2019 complicated with Bell's palsy: a case report

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Case Report

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Abstract

Background: Coronavirus disease 2019 (COVID-19) is a highly infectious disease, mainly causing respiratory symptoms. However, a few patients may also have neurological symptoms. Herein, we report a case of COVID-19 infection complicated with Bell's palsy.

Case presentation: A 65-year-old woman was admitted due to left facial drooping. Physical examination showed left peripheral facial paralysis. Brain MRI showed no abnormality. However, the chest CT revealed the ground-glass shadows in the right lower lung. The real-time reverse transcription-polymerase chain reaction (RT-PCR) results for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) RNA were positive through throat swabs, while the common influenza virus antigens were tested negative. The symptoms of left facial paralysis relieved after antiviral treatment. She patient was discharged in the context of 3 consecutively negative RT-PCR test results for SARS-CoV-2 RNA and complete absorption of the right lung lesions.

Conclusion: This case suggests that COVID-19 may be presented with Bell's palsy and may be a potential cause of facial paralysis.

Background

Bell's palsy, also known as the most common cause of peripheral facial paralysis, is an acute facial nerve disease in which the first symptoms can be pain in the mastoid region and cause facial hemiparesis or paralysis [1,2]. Although there is no direct evidence, more and more indirect evidence suggests that Bell's palsy is closely associated with virus infection and has the feature of seasonal onset [3,4]. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is an RNA virus, showing a high potent of person-to-person transmission and thus contributing to a large outbreak of coronavirus disease 2019 (COVID-19). COVID-19 mainly causes respiratory symptoms. In recent studies, some researchers indicated that COVID-19 could also lead to nervous system symptoms, such as headache, dizziness, encephalitis, and so on [5-9]. However, COVID-19 patients presenting with Bell's palsy at initial have not been documented in any available literature. Herein, we report a case of COVID-19 complicated with Bell's palsy.

Case Presentation

A 65-year-old woman was admitted to our hospital due to left facial drooping for 1 day. Two days before admission, she felt pain in the mastoid region. However, she had no fever, runny nose, cough and other symptoms, and had no history of cold before onset. Physical examination showed left peripheral facial paralysis without herpes zoster. Brain magnetic resonance imaging (MRI) showed no abnormality. However, the chest computerized topography (CT) examination showed patchy areas of ground-glass shadows in the right lower lung (**Figure 1A**). The results of two consecutive real-time reverse transcription-polymerase chain reaction (RT-PCR) tests were positive for SARS-CoV-2 RNA through throat swabs, while the common influenza virus antigens (including influenza A virus, influenza B virus, parainfluenza virus,

adenovirus, Coxsackie virus, respiratory syncytial virus and herpesvirus) were tested negative. The blood routine test and C-reactive protein level were both normal. She was eventually diagnosed with confirmed COVID-19 pneumonia complicated with Bell's palsy. The symptoms of left facial paralysis relieved after antiviral treatment with arbidol and ribavirin, and the lung shadows disappeared 1 month later (**Figure 1B**). She was discharged after three times of negative RT-PCR test results. There was no recurrence during the quarantine period outside the hospital.

Discussion

Bell's palsy is the most common cranial nerve paralysis, accounts for 60% - 70% of all causes of unilateral facial paralysis [1,2]. The etiology and pathological mechanism are still controversial. The main predispositions of Bell's palsy include cold, fatigue, decreased resistance and immune deficiency. Most studies suggest that Bell's palsy is related to an immune response after virus infection. Bell's palsy usually occurs 1-2 weeks after virus infection, which might be an autoimmune demyelination disease following virus infection [2-4]. The herpes simplex virus 1 (HSV-1) genome found in endoneurial fluid from the facial nerve of patients with Bell's palsy endorsed the hypothesis of an HSV-1 reactivation within the geniculate ganglion and subsequent inflammation and entrapment of the nerve at the meatal foramen or in the labyrinthine segment, which is believed to be the pathogenic mechanism of Bell's palsy [3,4,10]. In addition, Bell's palsy has some characteristics consistent with that of virus infection, such as seasonal prevalence [11,12].

COVID-19 is highly infectious and has caused an outbreak of pneumonia spreading from Wuhan, China to the whole world [5,6,9]. COVID-19 mainly causes respiratory symptoms in humans, and some patients can also have gastrointestinal, neurological, cardiovascular and other symptoms. Nervous system symptoms mainly include headache, dizziness and so on [5-6]. In addition, Chen et al [7] reported an asymptomatic case of COVID-19 pneumonia complicated with acute cerebral infarction of right corona radiata on March 2. Subsequently, on March 4, researchers from Beijing Ditan Hospital reported the first COVID-19 pneumonia complicated with encephalitis in the world, and confirmed the presence of SARS-CoV-2 RNA in cerebrospinal fluid of the patient by gene sequencing [8]. These cases suggested COVID-19 could also develop neurological symptoms and even had neurological symptoms as the first manifestation, especially in patients with asymptomatic or mild infection.

In this case, the patient was diagnosed as Bell's palsy without herpes zoster. Although Bell's palsy was believed to be related to virus infection, the detection of viral antigens did not find the evidence of other viral infections, including herpes zoster virus. Surprisingly, we found that the patient was infected by SARS-CoV-2. Therefore, it is supposed that SARS-CoV-2 infection may be associated with Bell's palsy in the patient reported here. It is found that angiotensin-converting enzyme 2 (ACE2) may be binded to the coronavirus and trigger functional changes in ACE2/Angiotensin \times Type 2 Receptor (AT2R), thereby resulting in an imbalance in the steady-state cytokine regulatory axis and a cytokine storm [13]. ACE2

exists in nervous system and skeletal muscle. The expression and distribution of ACE2 suggest that SARS-CoV-2 may cause some neurological symptoms through direct or indirect mechanisms. The facial nerve damage might be attributed to an immune response caused by SARS-CoV-2, but needs to be further confirmed by future research.

Conclusions

In summary, COVID-19 patients may present with Bell's palsy at initial. Bell's palsy might be attributed to an immune response caused by SARS-CoV-2.

Abbreviations

SARS-CoV-2: severe acute respiratory syndrome coronavirus 2; COVID-19: Coronavirus disease 2019; MRI: magnetic resonance imaging; CT: computerized topography; HSV-1: herpes simplex virus 1; ACE2: angiotensin-converting enzyme 2; AT2R: angiotensin α type 2 receptor

Declarations

Ethics approval and consent to participate

All authors' institutions did not require ethical approval for publication of a single case report.

Consent for publication

Written informed consent was obtained from the patient's son for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor of this journal.

Availability of data and materials

All data generated or analyzed during this study are included in this published article.

Competing interests

The authors have no conflicts of interest to declare.

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Authors' contributions

WY, CS, WM, and YM contributed to data collection and interpretation. WY and CS wrote the initial draft of the manuscript. WM assisted in the preparation of the manuscript. FQ and YM reviewed the manuscript. The authors read and approved the final manuscript.

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Figures

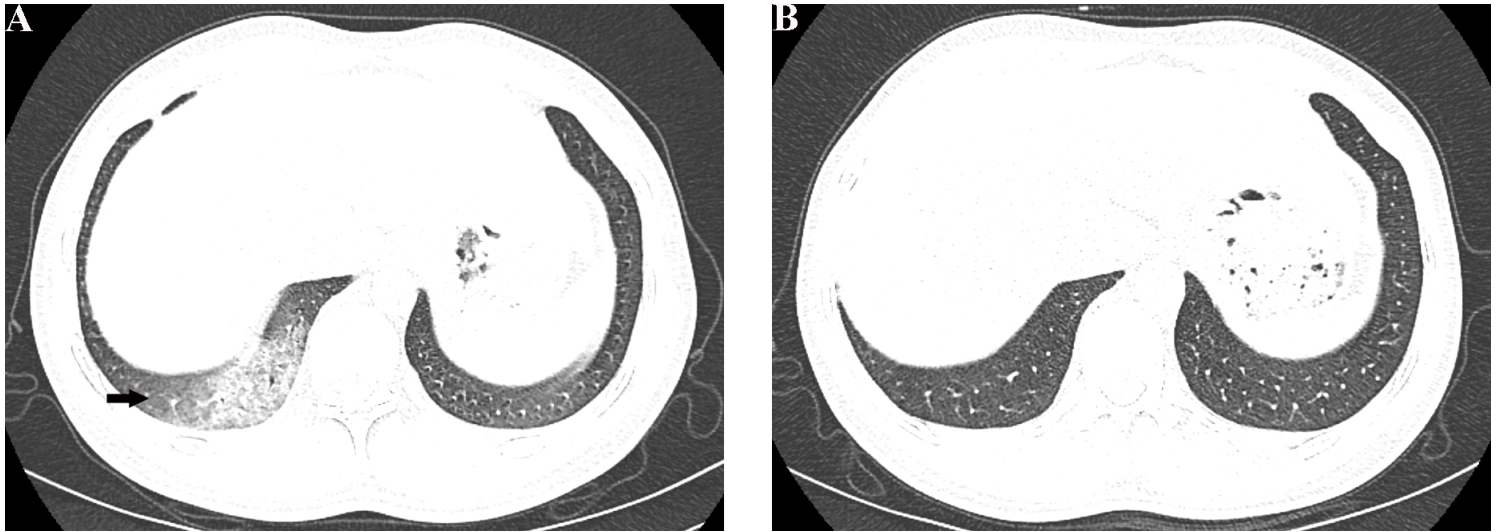


Figure 1

Chest CT on admission showed patchy areas of ground-glass shadows in the right lower lung and thickening of pulmonary interstitium (A, black arrow), and the right lung shadows disappeared with clear lung texture 1 month later (B).