



## Bell's Palsy Presented in the Course of COVID-19 Infection

### COVID-19 Enfeksiyonu Sırasında Gelişen Bell Palsi

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#### Abstract

COVID-19 is an infectious disease caused by a newly discovered coronavirus (SARS-COV-2) that can cause a broad spectrum of symptoms, from asymptomatic to severe respiratory failure. Although the virus mainly affects the respiratory system, it is also known to affect many other systems. Myalgia, hyposmia, anosmia, and Guillain-Barre Syndrome are the most common manifestations due to the peripheral nervous system being affected by the virus. Bell's palsy is a unilateral and sudden facial nerve paralysis. Viral infections are most frequently blamed for etiopathogenesis. Bell palsy due to COVID-19 infection has been reported in the literature as a rare complication. In this case, we wanted to emphasize that Bell's palsy should be kept in mind among the neurological complications that may develop due to COVID-in in a patient who developed Bell's palsy after being diagnosed with COVID-19.

**Keywords:** Bell's Palsy, COVID-19, Neurological Complication

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#### Öz

COVID-19 hastalığı yeni keşfedilen bir koronavirüsün (SARS-COV-2) sebep olduğu asemptomatik seyirden ağır solunum yetmezliğine kadar geniş spektrumda semptomlara yol açabilen bulaşıcı bir hastalıktır. Virüs esas olarak respiratuvar sistemi etkilemekle birlikte başka sistemleri de etkilediği bilinmektedir. Bunlardan biri de nörolojik sistemdir. Virüse bağlı periferik sinir sisteminin etkilenmesiyle en sık miyalji, hipozmi, anozmi ve Guillain Barre Sendromu görülmektedir. BP etyolojisinde en sık viral enfeksiyonların suçlandığı tek taraflı ve ani gelişen fasiyal sinir paralizidir. COVID-19 enfeksiyonuna bağlı gelişen Bell paralizisi (BP) nadir bir komplikasyon olarak literatürde bildirilmiştir. Bu vakada COVID-19 tanısı aldıktan sonra BP gelişen bir hastayı sunarak: BP'nin COVID-19'a bağlı gelişebilecek nörolojik komplikasyonlar arasında akılda bulundurulması gerektiğini vurgulamak istedik.

**Anahtar Kelimeler:** Bell paralizisi, COVID-19, nörolojik komplikasyon

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## Introduction

COVID-19 (coronavirus disease) was recognized as an infectious disease from a newly discovered coronavirus (SARS-COV-2) by World Health Organization 1. The disease can be asymptomatic or cause severe respiratory disorders, ranging from pneumonia to acute respiratory stress syndrome 2. Although the virus most commonly affects the respiratory system, it has also been observed to affect many other systems. One of these is the nervous system. This effect is thought to result from the direct effect of the virus on neurons or inflammation in the nervous system. The most common neurological symptom is headache. Dizziness, confusion, cerebrovascular disorders, olfactory and tasting disturbances, epileptic seizures, and myalgia are other neurological symptoms 3. These symptoms can appear even after the acute phase of COVID-19.

Bell's palsy (BP) is a sudden, unilateral facial nerve paralysis. It frequently develops because of a viral infection or is considered to be associated with a viral infection 4. There are rare reports about BP as a complication after a COVID-19 infection. BP is considered one of the neurologic manifestations of COVID-19 5. It is aimed to present a patient who developed BP during COVID-19 infection in this case report.

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## Case Report

A 22-year-old female patient was admitted to the emergency department with fever, sore throat, and nasal discharge. After a physical examination, a nasopharyngeal swab sample was taken considering the COVID-19 infection, and the patient was diagnosed with COVID-19 by real-time reverse transcriptase polymerase chain reaction (PCR) test. The patient was treated with favipiravir and paracetamol, and isolation at home was initiated. On the 4th day of the illness, the patient presented to the emergency department with head and neck pain and numbness on the left side of the face. She had no systemic disease or trauma history. On examination, vital signs were normal. The electrocardiogram was in a normal sinus rhythm. Muscle strength and sensory examination of the extremities were normal, deep tendon reflexes were normoactive, and no pathologic reflexes were found in the neurologic examination. The patient could not close his left eye completely and could not raise his left eyebrow ultimately, and facial asymmetry was present. Hypoesthesia was present in the left half of the face. Other cranial nerve examinations revealed no pathologic deficit. Complete blood count and biochemical tests were within normal limits. Antigen tests for herpes zoster and other viral infections showed no evidence of viral infection—pathologic reflexes. No pathology was found in cranial tomography and magnetic resonance imaging with diffusion. The patient was diagnosed with left peripheral facial paralysis, and 16 mg/day methylprednisolone treatment was initiated. Methylprednisolone treatment was decreased and discontinued in 21 days. The patient presented to the physical therapy outpatient clinic 3 days after the end of methylprednisolone treatment. Other system examinations were normal. House Brackman classification was matched with moderate

dysfunction. The patient presented to the physical therapy outpatient clinic 3 days after the end of methylprednisolone treatment. The patient's history was unremarkable, and he had no previous BP history. The patient could not close his left eye completely and could not raise his left eyebrow ultimately, and facial asymmetry was present. Hypoesthesia was present in the left half of the face. Other system examinations were normal. House Brackman classification was matched with moderate dysfunction. Hypoesthesia was present in the left half of the face. Other system examinations were normal. The patient was enrolled in a physical therapy program, and treatment was started with infrared, electrical stimulation, and facial paralysis exercises. After 15 physical therapy sessions, facial paralysis improved without sequelae. Written informed consent was obtained from the patient for the case report.

## Discussion

Bell's palsy is a rapidly progressive and unilateral peripheral paralysis of the seventh cranial nerve, which is the most common type of cranial nerve paralysis. The incidence in the general population is 11.5-53.3 per 100,000 6. It most commonly affects middle-aged and elderly patients. Viral infections, vascular ischemia, autonomic dysfunction, and inflammation are possible mechanisms involved in the development of BP 7. BP occurs suddenly, and the symptoms progress rapidly over several days. It is characterized by muscle weakness or total paralysis on one side of the face. Pain inside and behind the ear, numbness and tingling on one side of the face, hyperacusis, and impaired taste sensation on the ipsilateral anterior tongue are accompanying symptoms. The blurring of the nasolabial groove and facial and forehead lines is observed. The eyelid on the affected side cannot be closed, the lower eyelid drops, and so eyeball irritation leads to decreased lubrication 8.

The onset of symptoms on the 4th day after the diagnosis of COVID-19 in a young patient, the absence of any other viral infection in the tests performed, and the absence of any other neurologic disorder suggest that BP developed due to SARS-COV-2 infection for the patient.

Although the etiology of Bell's palsy is not known precisely, autoimmunity and viral infections are implicated in the pathophysiology. It is thought that the development of BP may be caused by the reactivation of latent herpes virus infection in the cranial nerve ganglion. Herpes virus DNA has been detected around the geniculate nucleus and in the facial nerve endoneurial fluid in patients with Bell's palsy. Viral infection or latent virus reactivation triggers autoimmune reactions against the myelin sheath of the peripheral nerve, leading to demyelination in the cranial nerves, especially the facial nerve 6.

The most common neurological symptoms during COVID-19 infection are headache, dizziness, impaired consciousness, encephalopathy, encephalitis, necrotizing hemorrhagic encephalopathy, stroke, and epileptic seizures; the most commonly encountered neurological symptoms related to the peripheral nervous system are hyposmia, anosmia, muscle aches, and Guillain Barre syndrome 9. There are reports of BP developing during COVID-19 infection in the literature 10. In a retrospective study of 348,088 patients diagnosed with COVID-19, it was reported that 284 (0.08%) patients developed BP 4.

SARS-COV-2 binds to angiotensin-converting enzyme-2 (ACE-2) and causes functional changes in ACE2/Angiotensin type 2 Receptor (ATR2), leading to the development of a cytokine storm 10. ACE-2 is also found in the neurological system and musculoskeletal systems. Virus binding with ACE-2 is thought to affect the neurologic system through direct or indirect mechanisms 11. Perhaps the facial nerve is affected by similar mechanisms after SARS-COV-2 as in autoimmunity resulting from infection with the herpes virus.

The number of studies on COVID-19 neurologic complications is quite limited. The most common central nervous system manifestations are headache, dizziness, and encephalopathy. The most common peripheral nervous system manifestations are loss of smell and taste. It has been reported that neurologic complications are more common in patients with severe COVID 12. Facial paralysis is among the rare neurologic symptoms. In a case series of eight patients, BP was the first symptom in three patients 13. In a

prospective cross-sectional study including 41 BP patients, the SARS-CoV-2 IgM + IgG (total) test was analyzed to investigate SARS-CoV-2 in the etiology of the patients. They found that 24.3% of patients with BP had a positive SARS-CoV-2 IgM + IgG antibody test. The results were found to be higher than seroprevalence studies conducted in asymptomatic individuals; it was stated that BP might be the only symptom of COVID-19 14. In a study conducted in Italy, emergency department BP admissions during the COVID-19 pandemic and the same period in 2019 were examined; it was observed that there were more BP admissions during the pandemic. Symptoms of SARS-CoV-2 infection were found in 21% of the applications. This suggests an increased risk of BP during or after COVID-19 15.

Our case and other studies in the literature have shown that BP is one of the complications of SARS-CoV-2 infection in the neurological system, which can occur at any stage of the disease. More comprehensive studies on more patients are required to elucidate the pathogenesis for the development of BP associated with COVID-19.

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