

Unilateral Vocal Cord Paralysis Case Related to COVID-19

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Abstract

Introduction: Although the most common neuro-otolaryngological findings associated with COVID-19 infection are chemosensory changes, it should be known that these patients may present with different clinical findings.

Case summary: We present a 57-year-old woman who developed progressive hoarseness while suffering from COVID-19 infection without a history of chronic disease or any other etiological cause. Laryngeal fibrescopy revealed left vocal cord fixed at the cadaveric position and there was 5-6 mm intraglottic gap during phonation. No other etiological cause was found in the examinations performed with detailed ear nose throat examination, neurological evaluations and imaging methods. Injection laryngoplasty was applied to the patient, and voice therapy was initiated, resulting in significant improvement in voice quality.

Discussion: The mechanism of the idiopathic vocal cord paralysis remains unclear, it is suspected to be related to COVID-19 neuropathy, because the patient had no preexisting vascular risk factors or evidence of other neurologic disease on neuroimaging. Laryngeal nerve palsies may represent part of the neurologic spectrum of COVID-19.

Conclusion: The possibility of the peripheral nerves damage caused by SARS-CoV-2, vocal cord paralysis should be considered when voice changes occur during COVID 19 infection.

Introduction:

The coronavirus disease 2019 (COVID-19), the causative agent of which is severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has been declared as a pandemic by the World Health Organization (WHO). The SARS-CoV-2 virus, the last identified member of the coronavirus family, is a single-stranded RNA virus that is transmitted via droplets [1]. It leads to significant morbidity and its mortality rate is estimated to be around 3.4% [2].

With the emergence of COVID-19 infection, clinicians around the world have highlighted the variation in symptoms of the disease in their reports .While the most common symptoms of the disease are high fever, cough and shortness of breath, other reported findings include diarrhea, nausea, vomiting, headache, sore throat, tiredness, muscle pain, and loss of taste and smell [3]. Although the SARS-CoV-2 virus primarily affects the respiratory tract, its neurotropic effect is demonstrated by experimental studies and case reports .The most prominent characteristic of the COVID-19 virus that distinguishes it from other upper respiratory tract infections is the findings of nerve and neurological involvement through angiotensin-converting enzyme 2 (ACE2) receptors [4]. Therefore, different cranial and peripheral nerve involvement findings and case reports associated with COVID-19 infection have been reported [5].

There are sample studies on different viral agents in the etiology of idiopathic vocal cord paralysis (VCP) [6].However, the literature review has shown that there is no case report presenting VCP associated with

COVID-19 infection. Here, we present a case of sudden unilateral VCP that is thought to be associated with COVID-19 infection.

Case Report:

A 57-year-old female patient presented to otolaryngology outpatient clinic with complaint of hoarseness. The patient with no known history of surgery or chronic disease had no recent upper respiratory tract infection, trauma or surgery history, except for COVID-19 infection confirmed by polymerase chain reaction (PCR) test fifteen days ago. She stated that she had complaints of myalgia, arthralgia, and severe cough during the disease, which were accompanied by hoarseness that started gradually seven days after the result came out positive. The thorax computed tomography (CT) performed during this period showed no findings compatible with pneumonia. The patient was followed as an outpatient without the need for hospitalization. However, she was admitted to our outpatient clinic since hoarseness continued despite the second COVID-19 test result became negative. The examination revealed paralysis in the cadaveric position of the left vocal cord. Furthermore, arytenoid was observed to be immobile, suggesting involvement of the superior laryngeal nerve. Laboratory and imaging tests were requested for other possible etiological reasons. No findings suggestive of other viral agents or systemic diseases were found in the laboratory tests performed. Contrast-enhanced CT examinations of brain, chest, and neck did not reveal any etiological cause. Only in neck CT, an appearance supporting VCP was reported. Similarly, neurological examination revealed no signs of other possible cranial/peripheral nerve involvement or additional neurological deficits. Acoustic analysis and sound handicap index assessment were performed and sound handicap index score was found to be 40. In the aerodynamic evaluation using the s/z ratio, the maximum phonation time was 4.23 seconds with the vowel /a/ and 5.22 seconds with the vowel /i/. In the acoustic analysis performed using Praat acoustic analysis programme©; the Jitter, shimmer, and noise-to-harmonic ratio (NHR) were found to be 16.32, 43.38, and 1.86, respectively.

Voice therapy was initiated and injection laryngoplasty with Radiesse® injection into the left vocal cord was performed under general anesthesia. Significant improvement was observed in sound quality and acoustic parameters in the postoperative period.

Discussion:

The most obvious theory of the neurological effects of the COVID-19 virus is the mechanism of ACE2, which is identified as a functional receptor of SARS-CoV-2. The virus reaches host cells via ACE2 receptor. This enzyme receptor is found mostly in type II alveolar cells in the lungs [4]. It is also produced by many cells, including glial cells and neurons. The presentation and distribution of ACE2 suggests that the COVID-19 virus may cause neurological-neural involvement through direct or indirect mechanisms. Studies have shown that the virus enters the central nervous system through the olfactory nerve, another pathway, and can spread from neuron to neuron via axonal transport [5]. Apart from direct neurological system invasion of the virus, neurological complications associated with COVID-19 may occur as a result of widespread cardiopulmonary insufficiency and metabolic abnormalities induced by SARS-CoV-2

infection or mechanisms of autoimmunity [7]. Neurological complications associated with COVID-19 can be divided into two: central and peripheral nervous system complications. While common central nervous system complications include headache, cerebrovascular events, encephalitis, and imbalance, the most common findings of peripheral nervous system complications are anosmia/hyposmia and chemosensory dysfunctions [5]. Furthermore, cases reported in the literature in terms of peripheral nerve involvement associated with COVID-19 virus are Guillain-Barré syndrome, facial nerve palsy, abducens nerve paralysis, optic neuritis and phrenic nerve involvement [8, 9, 10].

In the present case, the patient had a complaint of hoarseness that started concurrently with the COVID-19 infection. The examination performed following the COVID-19 positivity revealed left VCP, and there was no other reason to explain this condition in the etiology of the disease. The absence of pneumonia in the thorax CT findings of the patient suggested that it was due to vagal neuritis caused by nerve invasion of the virus, rather than the nerve being affected with possible mediastinal involvement. Furthermore, cadaveric position of the vocal cord and the presence of additional cranial nerve involvement findings supported the mononeuritis picture.

The literature review has shown that there are no unilateral or bilateral VCP cases in which varicella-zoster virus, cytomegalovirus and herpes zoster virus play a role in the etiology [6]. Although coronaviruses are a diverse family of viruses, they can lead to different symptoms in cases infected with COVID-19 as they are associated with high rates of neurological involvement. Altogether we do not have objective data to prove definitively this situation, when we consider other possible viral etiologies the most likely factor that could explain idiopathic VCP in our patient was the COVID-19 virus. Moreover, the present case will be thought-provoking for evaluating the movements of the vocal cords and changes in the voice quality in patients being infected with COVID-19 during the pandemic.

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Figures

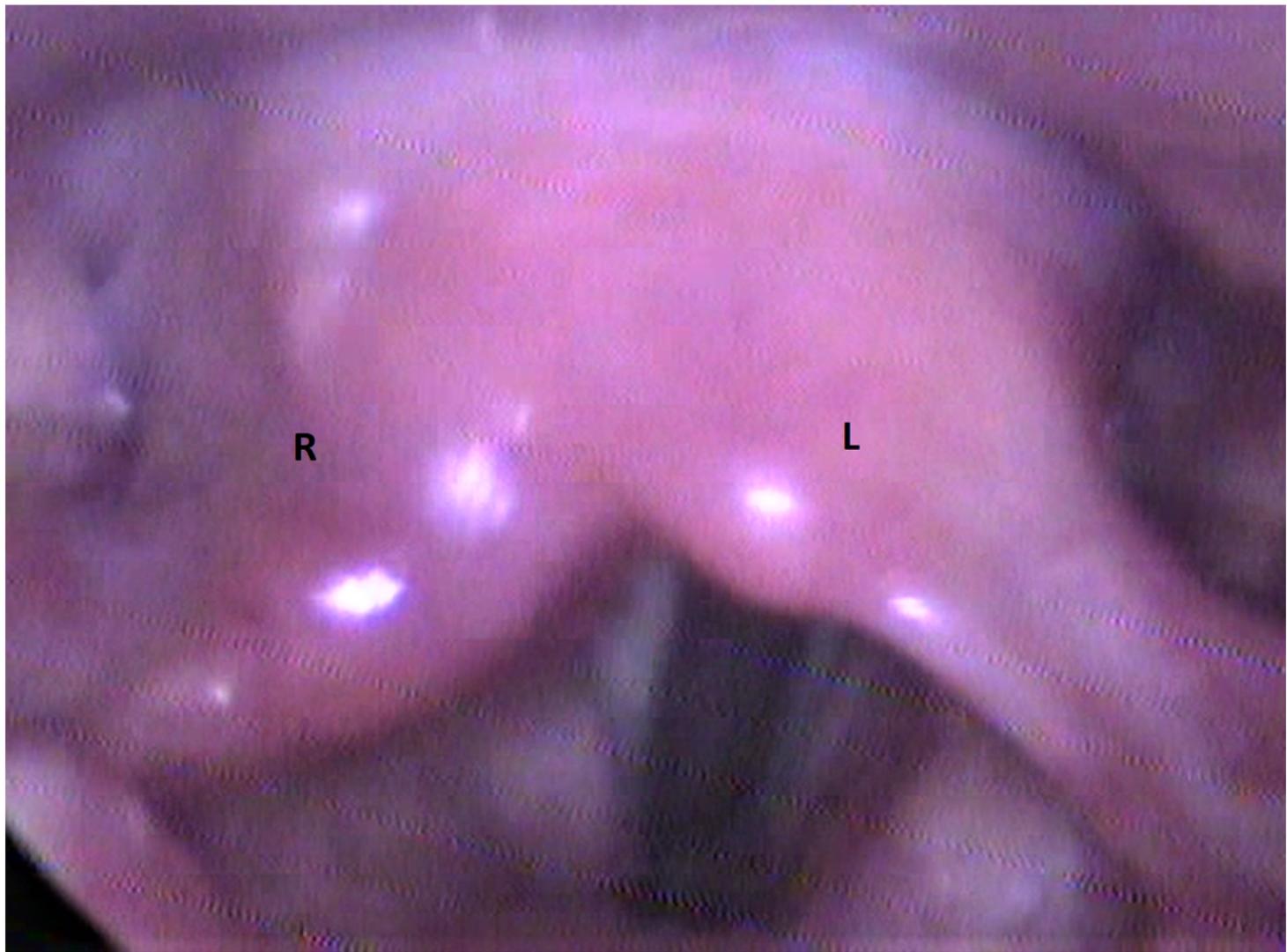


Figure 1

The left vocal cord is seen to be in the cadaveric position at laryngoscopic examination.



Figure 2

The left vocal cord is seen to be paralytic in the contrast-enhanced neck CT.