



Unilateral Vocal Cord Paralysis Following COVID-19 Infection: A Case Report and Literature Review

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Abstract

Background: Throughout the COVID-19 pandemic, numerous symptoms and complications were encountered. These symptoms ranged from conjunctivitis, diarrhea, and anosmia to headache, confusion, lightheadedness, acute cerebrovascular disease, epilepsy, acute disseminated encephalomyelitis, encephalitis, loss of taste, pain in muscles, and Guillain-Barre Syndrome. Some carriers were asymptomatic and only had a diminished sense of smell. Besides, one of the rare manifestations that may be encountered post-COVID-19 infection is vocal fold paralysis, unilaterally or bilaterally.

Case report: This is the case of a 47-year-old female patient presenting with hoarseness of 10 weeks duration and 11 weeks post-COVID-19 infection. Using laryngoscopy, the patient was diagnosed with right vocal cord paresis with incomplete abduction. However, there were no abnormalities found in the brain, thorax, or upper mediastinum. After refusing to take corticosteroids, gradual improvement in hoarseness was observed 2 weeks after her first visit to the clinic, and the patient reached complete remission in 4 weeks.

Conclusion: This case represents a very rare complication following coronavirus infection. Considering the sparse reports of such cases, it is extremely important to shed light on the possibility of vocal fold paresis after infection with COVID-19 and how these cases are being managed.

Keywords: COVID-19, Vocal Cord Paralysis, Vocal Cord Paresis, Dysphonia, Hoarseness, Vocal Fold Paralysis, Vocal Fold Paresis

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Background

The emergence of the single positive-strand RNA virus, COVID-19, has led to unexpected consequences that affected the world globally, economically, and socially. Most importantly, this virus caused an increased rate of mortality all around the world [1,2]. In February 2020, this virus was called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It is easily spread either directly through contact or indirectly by acquiring it through inhalation of infected air from a cough or sneeze of an infected individual. What makes this virus more dangerous and easier to acquire is the fact that it remains infective for hours on surfaces and can be transmitted easily through contact with these infected areas [3]. The symptoms of this disease range from fever, dry cough, sore throat, aches, fatigue, and nasal congestion to headache, conjunctivitis, diarrhea, and loss of sense of smell and taste. Some carriers may also be asymptomatic and may have a decreased sense of smell [3]. Furthermore, there are multiple risk factors distinguished for this virus that may contribute to the worsening of the disease stage. These include old age, gender, kidney, liver, lung, and heart abnormalities, immunodeficiencies, and pregnancy [1]. The common complications faced by these individuals are acute kidney injury, coagulopathies, and thromboembolism [1].

A less common set of symptoms encountered in more than one-third of COVID-19-infected patients are neurological symptoms. In some cases, these symptoms could even be one of the first symptoms presented [4]. Furthermore, these neurological symptoms have higher chances of being present in high-risk populations with a severe COVID-19 infection [4]. The neurological symptoms are divided into Central Nervous system-related (CNS) symptoms and Peripheral Nervous System (PNS) associated ones. The CNS-related symptoms include headache, lightheadedness, altered consciousness, acute cerebrovascular disease, epilepsy,

confusion, acute disseminated encephalomyelitis, and encephalitis. Whereas the PNS-associated ones include some milder symptoms like partial or complete loss of smell, partial or complete loss of taste, pain in muscles, and Guillain-Barre Syndrome [4]. Additionally, a very rare manifestation seen in some documented case series is the unilateral or bilateral vocal fold paralysis following COVID-19 infections [5-15].

This pandemic has demonstrated the dire need for progressive diagnostics and medications to avert, cure, and handle the transmission of this virus. Since COVID-19 is an easily spread infection for which there is currently no effective medication or vaccination, controlling the transmission of this disease is of paramount necessity [3].

In this paper, we report a case of a rare COVID-19 complication encountered in Lebanon. This case demonstrates unilateral vocal cord paralysis after infection with COVID-19.

Case Presentation

A 47-year-old female patient presented to the clinic with hoarseness of 10 weeks duration. History goes back to 11 weeks prior to presentation, when the patient experienced symptoms of COVID-19 infection, including dyspnea, nasal congestion, fever, headache, myalgia, bone aches, anosmia, ageusia, and diarrhea. Four days after the onset of symptoms, she developed constant hoarseness that persisted for more than 10 weeks and did not improve even with the resolution of COVID-19 symptoms. The patient was managed at home for COVID-19 and did not require hospitalization or intubation.

The patient is diagnosed with Type-II Diabetes Mellitus, which is well controlled with Metformin 850mg. She has no past surgical history.

A laryngoscopy was performed and showed right vocal cord paresis with incomplete abduction (Figure 1). An Multi-detector



Figure 1: Laryngoscopy showing right vocal cord paresis with incomplete abduction

Computed Tomography (MDCT) with contrast was performed to rule out other etiologies. It showed the absence of any abnormalities in the brain, thorax, and upper mediastinum. Neurologic physical examination did not show any deficit in other cranial or peripheral nerves.

The patient refused to start corticosteroid treatment. She reported gradual improvement in hoarseness 2 weeks after her initial visit to the clinic and reached complete remission in 4 weeks.

Discussion

COVID-19 infection involves a wide range of symptoms including respiratory, gastrointestinal, and neurologic symptoms [16]. Interestingly, neurologic symptoms have manifested with a wide spectrum of severity. Mild symptoms were noted and included ageusia, anosmia, myalgia, altered mental status, and dizziness. On the other hand, severe and detrimental neurologic manifestations like cerebrovascular diseases, epilepsy, seizures, meningitis, encephalitis, meningoencephalitis, Guillain-Barré Syndrome, Miller Fisher Syndrome, and Acute Myelitis were also reported in the literature [17]. Several studies have postulated that neurologic symptoms result from the spread of the COVID-19 virus to the neurons through hematogenous or transneuronal pathways [17-19]. The virus can have access to the bloodstream by binding to Angiotensin-converting Enzyme 2

(ACE2), found on the surface of epithelial cells of the airways, neurons, and glial cells. Subsequently, the virus can reach the blood-brain barrier, spread into the brain, and cause neurological symptoms. The virus can also infect neurons by directly passing through the olfactory bulb into the CNS. [17,18].

Vocal cord paralysis usually results from trauma, masses, iatrogenic, and idiopathic causes. Several scholars state that viral infection can be the hidden cause behind some of the idiopathic vocal cord paralysis cases. Their claim can be supported by the fact that various neuropathies following viral infections were reported in the literature. These include Bell's palsy, Guillain-Barre syndrome, and postherpetic neuralgia [20].

In this case, the most plausible cause of unilateral right vocal cord paralysis is the COVID-19 infection. The MDCT showed no mediastinal abnormalities, excluding the possibility of nerve damage due to mediastinal involvement. Additionally, the hoarseness occurred concomitantly with characteristic COVID-19 symptoms like anosmia and ageusia, which result from the neurotoxic effect of the virus and not nasal blockage or rhinorrhea [6,18]. Besides other differential diagnoses, it is important to note that the patient experienced mild respiratory symptoms, and did not require hospitalization or intubation. Finally, the fact that the patient's hoarseness returned to normal a few weeks after her check-up further supports our hypothesis of viral neuropathy.

An extensive literature search was conducted on Pubmed, Google Scholar, and ScienceDirect databases using the following keywords: "COVID-19", "Vocal Cord Paralysis", "Vocal Fold Paralysis", "Vocal Cord Paresis", and "Vocal Fold Paresis". Thereafter, cases diagnosed with vocal cord paralysis resulting from the COVID-19 infection were included. Cases associated with intubation, mediastinal mass, and a history of vocal cord trauma were excluded. The literature showed 31 cases of vocal cord paralysis caused by the COVID-

19 infection, published in 9 case reports and 2 case series. Table 1 summarizes the patients' characteristics, clinical presentation, clinical course, and management. In a case series that studied 16 patients presenting with new-onset hoarseness during or following COVID-19 infection, they noticed that most cases resulted from partial paralysis, and involved the left vocal cord [5].

Despite the fact that vocal cord paralysis can be easily visualized on endoscopy, it is recommended to perform Laryngeal electromyography (LEMG) for diagnosis. This test will help in ruling out other differential diagnoses and in predicting the prognosis and necessary management [20]. The treatment of post-viral vagal neuropathy is based on the patient's signs and symptoms [20]. The majority of cases of vocal cord paralysis post-COVID-19 infection managed with voice therapy showed significant improvement in hoarseness and did not require additional treatment [5,7].

Conclusion

In addition to the various symptoms and manifestations presented in COVID-19 infections, vocal fold paralysis is considered one of the rare and poorly documented manifestations observed after infection with COVID-19. This case report of unilateral vocal fold paralysis highlights the importance of a further understanding of this manifestation and its diagnosis. When a patient presents with hoarseness, and dyspnea concurrently or following common COVID-19 infection symptoms, physicians should consider the possibility of a vocal cord paralysis that could be easily visualized using endoscopy and confirmed using LEMG. As for the treatment, it is dependent on each patient's clinical manifestations following the viral infection.

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