



Case Report

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A Case Series of The Vertigo and Vestibular Neuritis Among COVID-19 Patients

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Abstract

Background: Studies have reported different symptoms of the COVID-19 pandemic in different people from the outbreak of COVID-19. One of these symptoms is the increased prevalence of vertigo and vestibular neuritis among COVID-19 patients.

Objective: The aim of this study was to report the 5 patients involved in COVID-19 with symptoms of vertigo and dizziness.

Method: Our COVID-19 patients (2 males and 3 females) aged from 15-to 71 years with symptoms of dizziness referred to Ayatollah Rouhani Hospital in Babol, Iran.

Results: The results of Magnetic resonance imaging, pure tone average, and tympanometry were normal. Videonystagmography and caloric tests of patients demonstrate the vestibular neuritis in these cases.

Conclusion: COVID-19 can have an impact on the vestibular portion of the 8th cranial nerve and causes vestibular neuritis since COVID-19 is a neurotropic virus.

Keywords: COVID-19, Vestibular neuritis, Vertigo, Dizziness, Caloric, Videonystagmography

Introduction

The Corona Virus 2019 (COVID-19) is a new virus that involved the whole world, and it is not fully understood yet [1]. The COVID-19 indicates vary symptoms among people around the world [2]. Vestibular neuritis is a disorder of the inner ear that results from damage and inflammation to the auditory-balance nerve (8th cranial nerve) following a viral infection. Symptoms of the vestibular neuritis include sudden dizziness, vertigo, balance problems, nausea, and vomiting [3]. The data collected by Wuhan has shown that 8% of the COVID-19 patients indicate the dizziness [4]. Another Wuhan study has reported 16.8% of vestibular symptoms due to COVID-19 [5]. The study published from China showed that dizziness is the most noticeable neurological effect of COVID-19 [6]. The severe acute respiratory syndrome coronavirus 2 or SARS-CoV-2 virus has a neuro-invasive potential to develop in the dizziness [7].

The Videonystagmography (VNG) is a diagnostic test for evaluation of function of the vestibular system and for detection the vestibular disorders [8]. The aim of this study was investigated the vestibular symptoms in the COVID-19 patients. We reported a series of 5 cases from Iran involved in the COVID-19 with different symptoms and severity, and they were eventually diagnosed with the vestibular neuritis. The experimental procedures were approved by the local ethics committee (IR.MUBABOL.HRI.REC.1400.141).

Case Presentation

Case 1

A 39-year-old Iranian man presented to the hospital on 14 December 2020 with sudden onset of acute vertigo, nausea and vomiting without fever. He had no history of change or loss of taste



and smell. He did not have any complain of hearing loss, tinnitus, and imbalance. He complained of the vertigo both at rest and movement and vertigo gets worse during the movement. He is a building painter. The Polymerase Chain Reaction (PCR) of nasal swab was positive and the Computed Tomography (CT) scan of his chest confirmed diagnosis of the COVID-19 infection. The CT and Magnetic Resonance Imaging (MRI) of his head and brain were normal and did not manifest any obvious pathology. His blood and urine tests were normal. The VNG showed spontaneous horizontal-torsional nystagmus to the left side. His caloric test showed unilateral right vestibular weakness. The tests results in case1 detected vestibular neuritis. Symptomatic treatment of the patient was started immediately after diagnosis.

Case 2

A 61-year-old Iranian housewife presented to the hospital on 19th December 2020 with symptoms of headache, nausea, vomiting, severe dizziness, and a tingling sensation in her left ear. She reported that her vertigo lasted 20 to 30 minutes. She did not have a cough, runny nose, or fever. She ruled out any history of dizziness or head trauma. Her PCR was positive, and a CT scan of her chest showed lesions in favor of the COVID-19 infection (Figure 1). Systemic, neurological examination and routine blood tests did not reveal any abnormalities. Gaze, saccade, pursuit, optokinetic, and Dix-Hallpike tests showed significant spontaneous nystagmus. The results of the VNG and the Dix-Hallpike test are in the favor of vestibular neuritis. She underwent home quarantine and began her drug treatment. She was found to be negative for the COVID-19 infection by the PCR after 3 weeks.

Case 3

A 33-year-old Iranian female presented to the hospital on 5th January 2021 employee with a history of 4 days of dizziness, mild fever, nausea, headache, and runny nose. The severity of symptoms had progressively worsened, and the episodes would last about 15 to 20 minutes. Her neurological examinations did not show any abnormalities and her urine toxicology. The rest of the laboratory parameters were completely within normal limits. CT scan of the head showed no acute pathology. Her otoscopic and tympanogram results were normal, and she did not have hearing loss, but we saw spontaneous nystagmus on initial examination. The result of her PCR test was positive. According to the test results, we concluded that the cause of vertigo is vestibular neuritis due to the COVID-19 infection. Her general condition was good, and she was not hospitalized and only underwent home quarantine and medication.

Case 4

A 71-year-old retired man presented to the hospital on 3rd March 2021 with a complaint of sudden dizziness and imbalance while walking in the early morning. He also had a history of falling while

trying to get up and walk. In addition to dizziness, he had shortness of breath, chest pain and tinnitus (white noise) in the ear but no symptoms such as headache, nausea, and vomiting. His neurological examinations did not show any acute defects. The caloric test showed unilateral weakness and spontaneous nystagmus seen to the right side. According to the clinical manifestations and the tests performed, the most likely confirmed opinion was a right vestibular neuritis probably caused by the SARS-CoV-2 infection. Symptomatic treatment was started for him.

Case 5

A 15-year-old Iranian girl presented to the Hospital on 24th April 2021 with symptoms of runny nose, muscle pain, high fever, shortness of breath, and chest pain. Immediately, PCR and CT scan of the chest were performed, and the test results were positive. She was hospitalized for 17 days and discharged after her test, and her symptoms decreased. She referred to a neurologist due to sudden dizziness after 2 days. Her neurological symptoms were normal, and the MRI findings of her brain ruled out the possibility of any acute pathology. Then, she was referred to the Hearing and Balance Clinic of Rouhani hospital. She did not have hearing loss and her audiometry, tympanogram and otoscopy results were normal. Her caloric test demonstrated one-sided weakness and the VNG results showed spontaneous, horizontal-torsional to the right side. (Figure 2) describes the VNG results in the case 5. The results demonstrated the vestibular neuritis.

Discussion

All these cases were diagnosed with vestibular neuritis. The vestibular neuritis or acute unilateral peripheral vestibulopathy is an acute vestibular syndrome (AVS) and one of the prominent features of this disease is a sudden onset of vertigo with nausea or vomiting and characterized by unsteady gait, head-motion intolerance, and spontaneous nystagmus lasting days to weeks. It is a viral or post-viral inflammatory disorder affecting the vestibular portion of the 8th cranial nerve [9,10].

The vestibular neuritis is not accompanied by auditory deficits. The caloric and the Video Head Impulse Test (VHIT) tests are used to confirm unilateral peripheral vestibular impairment [11]. The severity of the COVID-19 symptoms is attributed to the inflammatory response after the virus enters the host cell. The effects of the SARS-COV-2 same as the mechanism of varicella zoster (VZV) and human immunodeficiency virus (HIV) due to central nervous system infection or vascular damage caused by vasculitis or vasculopathy. Other members of the virus family have a history of attacks on the nervous system and optic neuritis, encephalitis, and encephalomyelitis [12,13]. Studies of 185 patients between 30 and 60 days after the diagnosis of the COVID-19 showed that 18.4% of people reported balance problems after infection, of which 32 patients reported dizziness (94.1%), and 2 patients reported severe

attacks of dizziness (5.9%). 43 patients (23.2%) reported tinnitus and 14 patients (7.6%) reported tinnitus and balance disorders [14].

Conclusion

The prevalence of vestibular neuritis has increased among patients with the COVID-19. The cause of this disease is probably related to the coronavirus and its effect on the vestibular nerve.

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Conflict of Interest

All authors declare they do not have conflict of interest.

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