

COVID-19-ASSOCIATED VESTIBULAR NEURITIS: A CASE REPORT

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ABSTRACT

Objective: The aim of this work is to present a rare case of vestibular neuritis induced by a COVID-19 non-severe infection, which had an unusual refractory response to symptomatic measures. **Case Description:** 53-year-old female, reported to the neurological department with acute vertigo, nausea, vomiting and a very severe gait impairment, after six weeks of a COVID-19 non-severe infection. Some of these episodes lasted up to 2 to 3 hours, and all happened spontaneously and were not precipitated by head movements. She denied symptoms as tinnitus, hearing loss, loss of consciousness, veering to one side when walking. She also denied any prior history of vertigo or recent trauma. The initial neurologic and otoscopic exam, out of seizures, were normal. Romberg maneuver and positioning maneuvers like Dix Hallpike, and Semont were negative. There were no abnormalities with the Magnetic Resonance Imaging (MRI), Computer Tomography (CT), audiometry, and blood exam. Vectionistagmography showed a preponderance of the right vestibular nerve during the caloric test. There was no improvement with symptomatic drugs, minimal improvement with benzodiazepine and vestibular rehabilitation and she still reports vertigo. **Conclusions:** We should be aware that vestibular neuritis can be associated with COVID-19 and may be more refractory to symptomatic measures than the vestibular neuritis we are used to.

Keywords: Covid-19; Coronavirus infections; Vestibular Neuritis, Vestibulocochlear Nerve Diseases.

NEURITE VESTIBULAR ASSOCIADA A COVID-19: UM RELATO DE CASO

RESUMO

Objetivo: O objetivo desse relato é descrever um caso raro de neurite vestibular induzida por uma infecção não severa de COVID-19, e apresentou resposta refratária não usual ao tratamento sintomático. **Descrição do Caso:** Feminina, 53 anos, procurou departamento de Neurologia referindo início agudo de vertigem, náusea e vômito e um acometimento severo de marcha após seis semanas de uma infecção de COVID-19 não severa. Alguns desses episódios duraram de duas a três horas, desencadeados espontaneamente e não precipitados por movimentos da cabeça. A paciente negou tinitus, hipoacusia, perda de consciência e desvio para algum lado ao deambular. Também negou histórico de trauma ou vertigens prévios. O exame neurológico e otoscópico iniciais, estavam normais. As manobras de Romberg, Dix Hallpike e Semont foram negativas. Não houve alterações nos exames de Ressonância Magnética, Tomografia Computadorizada, audiometria e exames de sangue. Vectionistagmografia demonstrou preponderância do nervo vestibular direito durante o teste calórico. Não houve melhora com tratamento sintomático, houve mínima melhora com uso de benzodiazepínicos e fisioterapia vestibular, e a paciente ainda reporta vertigem. **Conclusões:** Devemos ficar alertas para a possibilidade de neurites vestibulares associadas a COVID-19, e que essas podem ser mais refratárias ao tratamento sintomático do que as neurites vestibulares de costume.

Palavras-chave: Covid-19; Infecções pelo Coronavírus; Neurite Vestibular; Doenças do Nervo Vestibulococlear.

INTRODUCTION

Although respiratory disorders are the classic presentation of COVID-19, there are increasing reports about neurologic manifestations of SARS-CoV-2 infection. These features may be effects of complications secondary to hypoxia, vascular inflammation, and metabolic

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derangements of the systemic disease which can occur para-infectious, due direct viral cytopathy or cytokine storm, or post-infectious, probably cellular immune or antibody-mediated phenomenon [1].

The entrance of the virus in the CNS can occur in the ACE2 receptors of neuronal and glial cells via CSF, cranial nerves, neuronal dissemination, and hematogenous pathways [2,3].

Few reports of peripheral vestibular disorders arising from COVID-19 infection have been published. The aim of this work is to report on an acute vestibular neuritis associated to COVID-19 in a Brazilian 53-years-old female patient followed by a literature review on the subject.

CASE REPORT

53-year-old female, with no relevant medical or surgical history, has been showing vertigo after six weeks of a COVID-19 non-severe infection confirmed by polymerase chain reaction (PCR) test.

She has reported acute vertigo, nausea, vomiting and a very severe gait impairment. Some of these episodes lasted up to 2 to 3 hours, and all happened spontaneously and were not precipitated by head movements, however it worsened right after it. She was not able to explain the direction in which the movement worsened her symptoms.

She denied symptoms as tinnitus, hearing loss, loss of consciousness, veering to one side when walking, and any other cochlear symptoms during the episodes. In addition, there was no focal neurological deficits such as dysarthria and diplopia during or after the episodes. She also denied any prior history of vertigo or recent trauma.

After the vestibular symptoms improves, she complains dizziness and head lightness. During her COVID-19 infection six weeks before, she only related fever, dry cough, and asthenia, and denied any of her current vestibular symptoms. She was treated with conservative management and there was no report of diarrhea, abdominal pain, anosmia, or dysgeusia.

The initial neurologic and otoscopic exam, out of seizures, were normal. Romberg maneuver and positioning maneuvers like Dix Hallpike, and Semont were negative. There were no abnormalities with the Magnetic Resonance Imaging (MRI), Computer Tomography (CT), audiometry, and blood exam. Vectonistagmography showed a preponderance of the right vestibular nerve during the caloric test.

There was no improvement with symptomatic drugs such as meclizine, flunarizine, betahistine and dimenhydrinate. There was minimal improvement with vestibular rehabilitation and benzodiazepines and she still reports vertigo.

DISCUSSION

Vestibular neuritis (VN) is clinically defined by acute and prolonged vertigo of peripheral origin. Considered the second most common cause of peripheral vestibular vertigo, with the first being benign paroxysmal positioning vertigo (BPPV) [4]. VN is responsible for up to 9% of outpatient visits to clinics specialized in the treatment of dizziness, with an incidence of 3.5 per 100,000 population, a typical age of onset between 30-60 years and no significant gender difference [5]. Before the COVID-19 pandemic, acute peripheral vertigo had three major differential diagnosis: BPPV, VN and cerebellar stroke. But, in the current global scenario, we should also consider peripheral vestibular disorders associated with SARS-CoV-2 infection as a significant differential diagnosis, due the high prevalence of patient's exposure.

Our patient presented with a typical presentation of a peripheral vestibular disorder (PVD). According to Le, *et al.* a practical way to clinical characterize a PVD is through a bedside three-step oculomotor examination labeled Head Impulse, Nystagmus, Test of Skew (HINTS). A patient with unidirectional nystagmus, a positive head thrust in the direction opposite to that of the fast phase of nystagmus, lack of vertical eye misalignment, and no other neurologic features can be diagnosed with acute peripheral vestibulopathy with a high level of certainty [6].

Another important aspect in the clinical evaluation of VN is to rule out life-threatening disorders. Observational studies such as performed by Kattah, *et al.* showed that approximately 25% of acute vestibular syndrome presentations to the emergency department represent stroke etiology [7]. In this means, physicians need to be able to rule out life-threatening injuries and properly identify the etiology of vertigo, performing specific bedside tests (Table 1).

Table 1 - Clinical presentation and guide to bedside testing for BPPV, VN and cerebellar stroke.

Symptom	BPPV	Vestibular neuritis	Cerebellar Stroke
Vertigo when patient is still	No	Yes	Yes
Patient can stand unaided	Yes	Yes	May not be able to
Spontaneous and/or gaze-evoked nystagmus	No	Yes	Yes
Typical spontaneous and/or gaze-evoked nystagmus observed	Not present	Nondirectional horizontal/rotatory Not purely vertical	Various, including bidirectional horizontal/rotatory; sometimes vertical
Worse when patient moves their head	Yes	Yes	Yes
Other neurologic symptoms or findings	No	No	Often, but not always present
New hearing loss	No	No	Can occur
Appropriate to perform Dix-Hallpike Test	Yes	No	No
Nystagmus produced during Dix-Hallpike Test	Vertical upward and rotatory	Do not perform Dix-Hallpike	Do not perform Dix-Hallpike
Appropriate to perform HINTS plus examination	No	Yes	Yes
Results from HINTS plus examination	Do not perform HINTS plus testing	All four findings: Nondirectional nystagmus No vertical skew Abnormal hit No hearing loss HINTS plus: peripheral	Any of: Bidirectional nystagmus Vertical skew present Normal HIT New hearing loss HINTS plus: central
Imaging indicated	No	No	Yes
Primary treatment	Epley maneuver	Supportive treatment	Treatment for stroke

*BPPV: Benign Paroxysmal Positional Vertigo; HINTS: head impulse, nystagmus, and test of skew, with plus referring to a test of recent hearing loss; HIT: head impulse test; Adapted from: Tintinalli's emergency medicine: a comprehensive study guide, 9th edition. New York: McGraw Hill; 2020.

The reported prevalence of audiovestibular symptoms in COVID-19 patients is still very low. Either it indicates that these symptoms are indeed rare or if the attention of the researchers are more focused on potentially life-threatening symptoms, remains unclear.

Most cases of vestibular neuritis have satisfactory outcomes and a good response to antiemetic drugs and vestibular sedatives. Thus, we propose that COVID-19 infection induced vestibular neuritis in our patient and was the reason to the unusual refractory response to symptomatic measures she presented. This outcome correlates to the refractory response observed by Raza, *et al* [8].

In this means, we suggest that patients with acute peripheral vertigo refractory to symptomatic drugs should be questioned about recent COVID-19 confirmed infection, and if none, tested for COVID-19 by polymerase chain reaction (PCR) test.

CONCLUSION

Vestibular neuritis represents the second most common cause of peripheral vestibular vertigo, but in the middle of a SARS-CoV-2 pandemic we should be aware that this neurological disease can be associated with COVID-19 and may be more refractory to symptomatic measures than the vestibular neuritis we are used to. In this means, this report adds valuable information to the limited literature on neurologic manifestations of COVID-19 we currently have in literature.

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