

Dizziness after SARS-CoV-2 Infection is Multicausal and its Management Requires a Multidisciplinary Approach

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Abstract: This letter to the editor discusses the study by Daker et al. on dizziness after SARS-CoV-2 infection, which was attributed to either vestibular neuritis or benign paroxysmal positional vertigo. In 16 patients with RT-PCR-confirmed SARS-CoV-2 infection, new-onset post-infectious vertigo was attributed to vestibular neuritis in 12 patients and benign paroxysmal positional vertigo in 4 patients. However, before new-onset dizziness after COVID-19 can be attributed to vestibular neuritis or benign paroxysmal positional vertigo due to SARS-CoV-2 infection, all other causes such as diseases of the central nervous system, vascular system, heart, endocrine system and peripheral nervous system must be thoroughly ruled out

Keywords: vertigo, dizziness, SARS-CoV-2 infection, COVID-19, complication.

LETTER TO THE EDITOR

We were interested to read the article by Daker, *et al.*, on a cross-sectional study on dizziness as a first manifestation or complication of SARS-CoV-2 infection in 7 patients with COVID-19 and 37 patients with close contact with COVID-19 patients [Daker, L. I. *et al.*, 2023]. In the COVID-19 cohort, 6 patients had vestibular neuritis and 1 patient had benign paroxysmal positional vertigo (BPPV) [Daker, L. I. *et al.*, 2023]. In the close contact cohort, 9 patients had a positive PCR for SARS-CoV-2, 6 of whom had vestibular neuritis and the other 3 had BPPV [Daker, L. I. *et al.*, 2023]. It was concluded that dizziness could be a possible complication or presenting symptom in patients with COVID-19, mainly due to peripheral vestibular dysfunction [Daker, L. I. *et al.*, 2023]. The study is impressive, but some points need to be discussed.

MAIN TEXT

The first point is that the causal relationship between SARS-CoV-2 infection and dizziness has not been clearly established [Daker, L. I. *et al.*, 2023]. Therefore, we should know how causality between SARS-CoV-2 infection and dizziness was defined. Was causality defined as a short latency period between PCR positivity and the onset of dizziness or as PCR positivity at the onset of dizziness? Since the mean duration from the onset of SARS-CoV-2 infection to the onset of dizziness was 43.1 ± 8.6 days, with a range of 30 to 57 days, we should know how causality was established after such a long latency period.

The second point is that the 28 patients in the close contact cohort who tested negative for SARS-CoV-2 on RT-PCR should be excluded from the

study. Since these patients had not undergone SARS-CoV-2 infection, the dizziness in these 28 patients cannot be causally linked to SARS-CoV-2 infection.

The third point is that cerebral imaging was not performed in the patients with dizziness. In order to rule out or confirm a cause of dizziness in the central nervous system (CNS), it would have been imperative to perform cerebral imaging using cerebral magnetic resonance imaging (MRI) in addition to the clinical neurological examination. Since dizziness can also be a symptom of a disease of the peripheral nervous system (PNS), it would also have been useful to perform nerve conduction tests to rule out or confirm a sensory polyneuropathy. It is also conceivable that the dizziness occurred coincidentally during the SARS-CoV-2 infection but was actually due to stenosis or occlusion of the extra- or intracranial cerebral arteries. It would also have been imperative to rule out heart disease as a result of SARS-CoV-2 infection as the cause of the dizziness. Cardiac complications are common after SARS-CoV-2 infections [Krishna, B. A. *et al.*, 2024].

A fourth point is that the cause of dizziness in the group with close contact but negative RT-PCR for SARS-CoV-2 remains unclear. Since these patients had a negative history of dizziness according to the inclusion criteria, it should be clarified what caused vestibular neuritis in 15 of these patients and BPPV in 13 of these patients.

The fifth point is that the treatment and outcome of vestibular neuritis and BPPV were not reported [Daker, L. I. *et al.*, 2023]. In order to assess what

kind of treatment these patients need, it would have been useful to also specify the type of treatment used and its effect, as well as the long-term outcome of the included patients.

Future studies should focus on the relationship between SARS-CoV-2 infection as a cause of vestibular neuritis or BPPV. In particular, the pathophysiological background of how SARS-CoV-2 causes vestibular neuritis or BPPV should be investigated in more detail. In addition, patients who develop dizziness after SARS-CoV-2 infection should not only undergo an ear-nose-throat (ENT) examination and videonystagmography, but also a comprehensive diagnostic workup including cerebral imaging, EEG, carotid ultrasound, cardiac evaluation, spinal cord imaging, and NCSs.

CONCLUSIONS

Before a new onset of dizziness after COVID-19 can be attributed to SARS-CoV-2 infection, alternative causes must be carefully ruled out. This includes in particular the exclusion of diseases of the CNS, vessels, heart, endocrine system and PNS. Patients who develop dizziness during or

shortly after a SARS-CoV-2 infection should not only be examined by an ENT specialist, but also by a neurologist, cardiologist and endocrinologist to ensure that causes of dizziness other than vestibular neuronitis or BPPV are not overlooked.

ABBREVIATIONS

BPPV	benign paroxysmal positional vertigo
CNS	central nervous system
ENT	ear nose throat
MRI	Magnetic resonance imaging
NCSs	Nerve conduction studies
PNS	peripheral nervous system

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