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## Short communication

# COVID-19 presenting with nystagmus<sup>☆</sup>



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### ABSTRACT

This case reports a 20-year-old female patient who was in northern Italy when the state of emergency was declared on the 31st of January 2020, developing 15 days after return to Spain upper respiratory symptoms characterized by fever, headache and anosmia that was treated as sinusitis. Three weeks later presented with dizziness and an intermittent horizontal nystagmus with rotatory component. Otorhinolaryngology and neurological examination including MRI were normal. COVID-19 IgG antibodies were positive. In the context of the ongoing pandemic, and associating the symptoms with positive IgG antibodies, we can consider the infection of SARS-CoV-2 as a probable cause of the acquired nystagmus.

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### COVID-19 asociada a nistagmo

#### RESUMEN

Presentamos el caso de una mujer de 20 años que se encontraba en el norte de Italia cuando se decretó el estado de alarma el 31 de enero 2020 volviendo a España. A los 15 días de su regreso presentó un cuadro respiratorio de vías altas con fiebre, cefalea y anosmia que fue tratado como una sinusitis y a las tres semanas comenzó con sensación de mareo y un nistagmus horizontal en ambos ojos con componente rotatorio. La exploración otorinolaringológica y neurológica con resonancia magnética fueron normales. Las pruebas serológicas para Covid-19 dieron un resultado positivo para anticuerpos IgG. En el contexto actual de pandemia, los síntomas y signos en esta paciente asociados a un test serológico IgG positivo nos permite considerar como causa del nistagmus adquirido la infección por SARS-CoV-2.

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#### Palabras clave:

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## Clinic case report

A 20-year-old woman with no history of interest, student in Bologna, Italy, who returned to Spain when Italy declared a state of emergency on January 31, 2020. Fifteen days after her return to Madrid, she presented with an infectious condition of upper respiratory tract with cough, rhinorrhea and fever accompanied by headache and anosmia, without respiratory difficulty. She was diagnosed with sinusitis by her primary care physician and treated with cefuroxime 500 mg oral twice a day for one week.

Three weeks after the onset of symptoms, he had a feeling of dizziness and involuntary, intermittent movements of both eyes that increased in intensity and frequency to 20 episodes per day, lasting 10–15 s and with no predisposing factor.

She visited the hospital for urgent ophthalmological assessment in April 2020; the examination comprised distant visual acuity (no refractive defect), pupils, slit lamp and fundus without findings of interest. In extrinsic ocular motility, versions and ductions were normal, but two episodes of nystagmus of about 10 s duration could be objectified in both eyes in horizontal asymmetric spring, greater in the left eye, in all the diagnostic positions of the gaze, with rotating component in primary position and without blocking position.

During the urgent assessment by neurology, an episode of nystagmus was also referred and pathology was ruled out by means of cerebral magnetic resonance with fine sections in the axial plane in T1, FLAIR and T2 and coronal images in T2 that were normal with and without contrast.

In the deferred exploration by otolaryngology, audiometry and vestibular tests were performed with normal results. Serological tests for COVID-19 showed that the IgG antibody was positive.

In the follow-up, 4 months after the onset of symptoms, the patient reported progressive improvement, with one or no episodes per day of nystagmus and increasingly spaced in time.

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## Discussion

A patient who developed intermittent horizontal nystagmus in both eyes 3 weeks after symptoms related to SARS-CoV-2 infection, with normal imaging tests and neurological study is described. In the context of the current pandemic and relating symptoms to positive IgG serology, SARS-CoV-2 infection may be considered a likely cause of acquired nystagmus.

The mechanism of action for the neurological invasion of SARS-CoV-2 has not yet been specified. Several theories have been postulated that could include: neural invasion through the bloodstream, direct neuronal pathway by migration through the olfactory tract, hypoxia injury, immune injury/cytokine storm syndromes, and expression of angiotensin-converting enzyme receptor 2 (ACE2R), among others.<sup>1</sup> Although ACE2R is mainly found in the alveolar epithelium of the lung, it is also present on the surface of CNS neurons, suggesting potential neurotropism.<sup>2</sup>

Nystagmus is an abnormal eye movement with alternating fast and slow components.<sup>3</sup> The clinical features of nystagmus

include whether it is spontaneous or triggered by a provocative maneuver, its dominant direction, its duration and intensity profile, and changes when the eyes move in different gaze positions. Nystagmus can be congenital or acquired. Congenital nystagmus develops in the first 6 months of life and acquired nystagmus appears after this period. Acquired nystagmus is usually due to neurological diseases and patients will refer oscillopsia.<sup>4</sup>

Depending on the characteristics of the nystagmus, the lesion can be located and the cause identified.<sup>5</sup> In the presence of a patient with dizziness and nystagmus evoked by the gaze, a central lesion should be suspected even with a negative imaging test, computerized tomography or magnetic resonance imaging (MRI).<sup>6</sup>

Viral infections associated with nystagmus have been described, as well as in infants with congenital microcephaly associated with Zika virus.<sup>7</sup> In these children, ocular alterations are related to severe microcephaly. The presence of nystagmus associated with congenital infection by cytomegalovirus has also been described. In a prospective study using a urine culture within 3 days of life, nystagmus was detected in 14.3% at an average age of 7.9 years in symptomatic patients and was highly correlated with cortical visual impairment and severe visual disability.<sup>8</sup> Patients with HIV infection may show various neurological complications from immune disorders such as Fisher's syndrome, which is characterized by ophthalmoplegia, ataxia and areflexia. In these HIV-infected patients, nystagmus has been described as associated with increased serum anti-GQ1b antibody.<sup>9</sup>

In the present case, it would be possible that nystagmus was a manifestation of acute cerebrovascular disease associated with SARS-CoV-2, but in a young woman with no risk factors this etiopathogeny seems less likely than direct CNS infection. It should also be noted that in anamnesis the patient -and her father, who was accompanying her- were insistently asked about any episode prior to this nystagmus process, which they denied. However, we cannot rule out the possibility that the patient had a latent nystagmus and that it could have become evident in the context of her poor general condition due to the upper respiratory tract infection.

The level of ACE2R expression in different tissues could be critical to susceptibility, symptoms and outcomes of COVID-19<sup>10</sup> infection. Further studies are needed to understand the various neuro-ophthalmological manifestations of COVID-19 as in this case of nystagmus, as well as its clinical approach and prognosis.

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## Conflict of interests

No conflict of interests was declared by the authors.

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