



Human herpes 6 encephalitis in co-infection with Covid-19

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A 2-year-old-boy presented with ensuing convulsions lasting 40 min (neurological disorders never referred in anamnesis), 3-day history of low-grade fever, erythematous rash on the trunk. Treatment with Midazolam in continuous infusion was started (0.01 mg/kg/h). For the strong suspect of meningoencephalitis, a magnetic resonance imaging (MRI) in emergency was performed, showing an altered signal in temporal lobe (imagine 1), and a lumbar puncture which revealed clear, non-hemorrhagic cerebrospinal fluid (CSF) with 278 cells/ μ L (70% lymphocytes). The real-time polymerase chain reaction (qPCR) assay from a nasopharyngeal swab revealed the presence of the Sars-Cov2 in the child and the mother. Treatment with intravenous acyclovir (10 mg/kg three times a day) and ceftriaxone (70 mg/kg/day) was started. The analysis of the CSF revealed the presence of HSV-6 DNA by PCR. The antibody titer in the blood showed IgM for HSV-6. The immune system was studied revealing that he was an immunocompetent subject. After 2 weeks of treatment with acyclovir, child was discharged in good conditions. After treatment, a control MRI showed a partial disappearance of the strong signal in the temporal lobe precedent described.

In children, primary infection with HSV-6 consists in roseola, a self-limited disease characterized by fever, rash, and pharyngitis. Rare cases of encephalitis to HSV-6 have

been reported in immunocompetent individuals, all infants younger than 3 years [1]. The damage seems related to the indirect effects of cytokine release rather than from direct viral CNS infection [2]. Thus, a co-infection viral may worsen cytokine release and contribute to clinical manifestations.

Many neurological manifestations are described in children affected by Covid-19 and some cases reported encephalitis. Although, most of these reports have had normal neuroimaging. Interestingly, a single study reported a neonatal case affected by seizures and MRI suggestive of viral encephalitis [3].

Diverse and different pathophysiological mechanisms behind neurologic manifestations associated with SARS-CoV-2 infection have been supposed. Some authors proposed an immune-mediated mechanism, reporting Guillain-Barré syndrome or acute disseminated encephalomyelitis [4]. Others supposed the possibility of invasion of Sars-Cov19 because the virus binds the surface spike protein to the human angiotensin-converting enzyme 2 receptor (ACE-2) and ACE-2 is present in the brain vascular endothelium [5]. Differently, others correlate the neurologic features with a severe state of inflammation. Our experience contributes to giving value to this last hypothesis.

Finally, it is interesting observing that multiple studies have been published regarding coinfections with other respiratory pathogens or bacterial infections among patients with COVID-19 [6]. To date, it is the first case of HSV-6 encephalitis in the context of co-infection with Sars-Cov19. In addition, it is a rare study describing MRI abnormality in a child with COVID-19-associated encephalitis (Fig. 1).

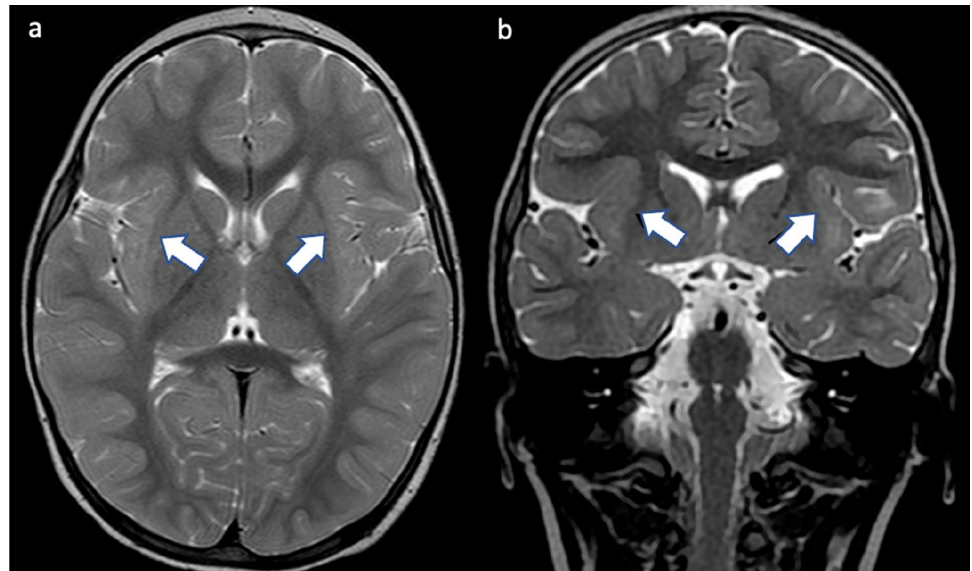
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Fig. 1 MRI of the patient. **a** Axial T2-weighted MR image (left), **b** Coronal T2-weighted MR image (right); images show a hyperintense lesion on the insular cortex with swollen appearance (white arrows)



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Declarations

Conflict of interest The authors have no ethical conflicts to disclose.

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