

## Autonomic evoked potential indices in children with cerebellar tumors

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### Abstract

**Background:** The cerebellum is an important cerebral structure in autonomic homeostasis maintenance. In patients with cerebellar tumors following the dislocation of brain structures, various autonomic disorders occur, including suprasegmental disorders. The aim was to study the indices of autonomic evoked potentials, at the stimulation of the left and right hand in patients with cerebellar tumors.

**Material and methods:** There were studied 15 healthy children and 36 pediatric patients with cerebellar tumors: left hemisphere (LH) – 15; vermis (VE) – 11; right hemisphere (RH) – 10. To record the evoked autonomic potentials, there was used NeuroMEP complex (Neurosoft). The latent period (LP, s) and the maximum amplitude of the autonomic response (Amax, mV) were analyzed. The statistical veracity (p) was calculated in comparison with healthy children.

**Results:** Autonomic indices when stimulating the left hand were: RH lesion – LP =  $1.44 \pm 0.19$  s, Amax –  $3.01 \pm 0.12$ ; LH lesion – LP =  $1.33 \pm 0.009$ , Amax –  $2.80 \pm 0.13$  (p < 0.01); VE lesion – LP =  $1.35 \pm 0.04$  (p < 0.01), Amax –  $2.56 \pm 0.15$  (p < 0.001). Healthy children – LP –  $1.54 \pm 0.05$ , Amax –  $3.40 \pm 0.15$ .

Autonomic indices when stimulating the right hand were: RH lesion – LP =  $1.39 \pm 0.11$ , Amax –  $2.65 \pm 0.1$  (p < 0.05), LH lesion – LP –  $1.44 \pm 0.13$ , Amax –  $3.15 \pm 0.21$ , VE lesion – LP –  $1.32 \pm 0.04$  (p < 0.005), Amax –  $2.60 \pm 0.009$  (p < 0.01). Healthy children – LP –  $1.49 \pm 0.006$ , Amax –  $3.37 \pm 0.22$ .

**Conclusions:** In children with cerebellar tumors, there was observed a generalized autonomic deficit in the vermis lesion and mainly homolaterally in the lesion of the cerebral hemispheres. Injury of the vermis, as opposed to lesions of the hemispheres, is manifested with a decrease in the conduction velocity of the nerve impulses, through the autonomic pathways.

**Key words:** cerebellar tumors, latent period, autonomic response amplitude.

## Overlap mechanisms of transient global amnesia and COVID-19 infection: review

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### Abstract

**Background:** An increasing number of patients with Transient Global Amnesia (TGA) was reported during the COVID-19 pandemics. However, there are limited data on the mechanisms of TGA linked with this infection. The aim of the study was to analyze the effect of COVID-19 infection on the hippocampal function and its potential mechanisms for TGA. A narrative literature review was performed, while searching on PubMed the following keywords: “transient global amnesia”, “COVID-19”, “hippocampus”. Ten English-written publications (clinical cases, cross-sectional studies, prospective studies) were selected. The time period covered was 2019 – 2021. During recovery from COVID-19, frequent cases of neurocognitive deficits (78%) were reported. It's also known that TGA can be triggered by physical and emotional stress. It is possible that TGA's pathogenesis (arterial ischemia, venous congestion, metabolic stress) could involve the CA1 hippocampal region – the most sensitive area to hypoxia, linked to afferent inputs from the medial and lateral entorhinal cortexes. These regions include high concentrations of Zinc ions and play a key role in modulating memory and spatial learning. Meantime, SARS-CoV-2 was previously detected in the olfactory bulb, amygdala, entorhinal, temporal and frontal cortex (20%); and most severe cases COVID-19 were associated with Zinc deficiency (57.4%).

**Conclusions:** The review highlights the precipitating events for TGA and their implications at the hippocampal level, jointly with similar pathophysiological changes reported in the novel coronavirus infection. This could explain the effect of COVID-19 infection on the hippocampus function and the potential mechanisms for TGA.

**Key word:** COVID-19, transient global amnesia, hippocampus (CA1 region).