**Cerebral Autoregulation during Active Standing Test in patients with Instantaneous Orthostatic Hypotension**

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**Abstract:** Instantaneous orthostatic hypotension (INOH) is a main subset of orthostatic intolerance (OI) in children and adolescents. INOH patient’s arterial pressure drop after active standing is large and its recovery slow. INOH is classified into mild and severe forms by recovery time from arterial pressure drop [1]. OI patients’ cerebral autoregulation was reported to be impaired with their oxygenated hemoglobin (oxy-Hb) under orthostatic load significantly decreased compared with healthy control [2]. We reported that changes of cerebral blood oxygenation during active standing in children with postural tachycardia syndrome (another OI subset) were asymmetric [3]. However, relationships between changes of cerebral oxygen metabolism and of arterial pressure during active standing in INOH patients with marked hemodynamics remain unclear. Therefore, we investigated changes of cerebral oxy-Hb in bilateral frontal cortex during an active standing test in young INOH patients. We enrolled 82 INOH patients (mean age: 13.8±2.2 years, 52 mild and 30 severe patients) and performed an active standing test using a non-invasive beat-to-beat blood pressure and heart rate monitoring device at Nihon University Itabashi Hospital since October 2013. We measured oxy-Hb of bilateral frontal cortex using near-infrared spectroscopy (PocketNIRS Duo<TM>, Hamamatsu Photonics). We found statistically that oxy-Hb decreased in left frontal cortices of patients of both forms, and in the right frontal cortices of mild INOH patient, while there was no such decrease in right frontal cortices of severe patients. Rapid recovery from the initial drop of oxy-Hb at the onset of active standing was more significant on the right side than on the left side. In conclusion, severe INOH patients’ data show that the cerebral oxygenation of their right frontal cortices stays constant with all blood pressure drop, which suggests some cerebral autoregulation working. We can assume that the right frontal cortex activity is strongly involved in the autonomic nerve system.

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