**Changes of Cerebral Blood Oxygenation in Patients with Delayed Orthostatic Hypotension During Active Standing Test**

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**Abstract:**

Delayed OH (Delayed Orthostatic Hypotension) is one of the subtype of Orthostatic Intolerance. Delayed OH is defined the normal blood pressure immediately after standing, but after 3 minutes the systolic blood pressure drops by more than 20mmHg or 15% at the time of the spine position [1].

We enrolled 25 children (8 boys and 17 girls, with an age of 9 to 18 years) who were diagnosed as Delayed OH at Nihon University Itabashi hospital in Tokyo between 2014 and 2018.

We performed active standing test to diagnose Delayed OH. We measured bilateral frontal cerebral oxygenated hemoglobin (oxy-Hb), deoxygenated hemoglobin (deoxy-Hb) and total hemoglobin by Near Infra-Red Spectroscopy (Pocket NIRS Duo<TM>, Hamamatsu Photonics, Shizuoka, Japan), and noninvasive beat-to-beat arterial blood pressure during spine position and active standing [1].

Changing patterns of cerebral blood oxygenation during active standing in children with Delayed OH were investigated. 14 patients (56%) showed symmetrical change of cerebral blood oxygenation in both side. There were 2 patients with no difference of cerebral blood oxygenation between spine position and active standing. 11 patients (44%) had asymmetrical change of cerebral blood oxygenation. Most common changing patterns of cerebral blood oxygenation were oxy-Hb decrease, deoxy-Hb increased, and total Hb decreased or increased. In these patterns, the change with decreased total Hb observed in 11 patients. In other hand, a pattern with increased total Hb was detected in 10 patients. In each pattern, symmetrical change of cerebral blood oxygenation was detected 50% of patients. In conclusion, we showed the typical pattern of cerebral blood oxygenation in patients with Delayed OH. This result indicates the cerebral ischemia and/or hypoxia during active standing test due to impairment of cerebral blood autoregulation.

1. Tanaka H, Fujita Y, et al. Japanese clinical guidelines for juvenile orthostatic dysregulation version 1. Pediatrics international : official journal of the Japan Pediatric Society. 2009;51(1): 169-79.

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