

Relationship between Pushing Behavior and Subcortical White Matter Lesion in the Acute Phase after Stroke

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Abstract : Aim: Pusher behavior (PB) is a disorder in which stroke patients shift their body weight toward the affected side of the body (the hemiparetic side) and push away from the non-hemiparetic side. These patients often use further pushing to resist any attempts to correct their position to upright. It is known that the subcortical white matter lesion (SWML) usually correlates of gait or balance function in stroke patients. However, it is unclear whether the SWML influences PB. The purpose of this study was to investigate if the damage of SWML affects the severity of PB on acute stroke patients. Methods: Fourteen PB patients without thalamic or cortical lesions (mean age 73.4 years, 17.5 days from onset) participated in this study. Evaluation of PB was performed according to the Scale for Contraversive Pushing (SCP) for sitting and/or standing. We used modified criteria wherein the SCP subscale scores in each section of the scale were >0 . As a clinical measurement, patients were evaluated by the Stroke Impairment Assessment Set (SIAS). For the depiction of SWML, we used T2-weighted fluid-attenuated inversion-recovery imaging. The degree of damage on SWML was assessed using the Fazekas scale. Patients were divided into two groups in the presence of SWML (SWML+ group; Fazekas scale grade 1-3, SWML- group; Fazekas scale grade 0). The independent t-test was used to compare the SCP and SIAS. This retrospective study was approved by the Ethics Committee. Results: In SWML+ group, the SCP was 3.7 ± 1.0 points (mean \pm SD), the SIAS was 28.0 points (median). In SWML- group, the SCP was 2.0 ± 0.2 points, and the SIAS was 31.5 points. The SCP was significantly higher in SWML+ group than in SWML- group ($p < 0.05$). The SIAS was not significant in both groups ($p > 0.05$). Discussion: It has been considered that the posterior thalamus is the neural structures that process the afferent sensory signals mediating graviceptive information about upright body orientation in humans. Therefore, many studies reported that PB was typically associated with unilateral lesions of the posterior thalamus. However, the result indicates that these extra-thalamic brain areas also contribute to the network controlling upright body posture. Therefore, SMWL might induce dysfunction through malperfusion in distant thalamic or other structurally intact neural structures. This study had a small sample size. Therefore, future studies should be performed with a large number of PB patients. Conclusion: The present study suggests that SWML can be definitely associated with PB. The patients with SWML may be severely incapacitating.

Keywords : pushing behavior, subcortical white matter lesion, acute phase, stroke

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