論 文 要 旨

Quantitative behavioral evaluation of a non-human primate stroke model using a new monitoring system

Toshikazu Hirohata

Background: Recently, the common marmoset (*Callithrix jacchus*) has attracted significant interest as a non-human primate stroke model. Functional impairment in non-human primate stroke models should be evaluated quantitatively and successively after stroke, but conventional observational assessments of behavior cannot fully fit this purpose. In this paper, we report a behavioral analysis using MarmoDetector, a three-dimensional motion analysis, in an ischemic stroke model using photosensitive dye, along with an observational behavioral assessment and imaging examination.

Methods: Ischemic stroke was induced in the left hemisphere of three marmosets. Cerebral infarction was induced by intravenous injection of rose bengal and irradiation with green light. The following day, the success of the procedure was confirmed by magnetic resonance imaging (MRI). The distance traveled, speed, activity time, and jumps / climbs were observed for 28 days after stroke using MarmoDetector. We also assessed the marmosets' specific movements and postural abnormalities using conventional neurological scores.

Results: MRI diffusion-weighted and T2-weighted images showed hyperintense signals, indicating cerebral infarction in all three marmosets. MarmoDetector data showed that the both indices immediately after stroke onset and gradually improved over weeks. Neurological scores were the worst immediately after stroke and did not recover to pre-infarction levels during the observation period (28 days). A significant correlation was observed between MarmoDetector data and conventional neurological scores.

Conclusion: In this study, we showed that MarmoDetector can quantitatively evaluate behavioral changes in the acute to subacute phases stroke models. This technique can be practical for research on the pathophysiology of ischemic stroke and for the development of new therapeutic methods.

（ Frontiers in Neuroscience 2022 Sep 1;16:964928.22 ）