

Neurophysiologic predictors of motor function in stroke.

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Citation

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Abstract

PURPOSE: Understanding the neural mechanisms of stroke recovery is of paramount importance for neurorehabilitation.

METHODS: For this purpose, we analyzed several TMS and EEG variables and their association with motor recovery. Thirty-five subjects with chronic stroke were recruited. The neurophysiological examination included assessments by transcranial magnetic stimulation (TMS), intra- and inter-hemispheric EEG coherence in different frequency bands (e.g. alpha (8-13Hz)) as determined by quantitative electroencephalography (qEEG). Motor function was measured by Fugl-Meyer (FM). Multiple univariate and multivariate linear regression analyses were performed to identify the predictors for FM.

RESULTS: Multivariate analyses, showed a significant interaction effect of motor threshold (MT) in the lesioned hemisphere and beta coherence in the unlesioned hemisphere. This interaction suggests that higher beta activity in the unlesioned hemisphere strengthens the negative association between MT and FM scores.

CONCLUSIONS: Our results suggest that MT in the lesioned hemisphere is the strongest predictors of motor recovery after stroke. Moreover, cortical activity in the unlesioned hemisphere measured by qEEG provides additional information, specifying the association between MT and FM scores. Therefore, complementary application of EEG and TMS can help constitute a better model of the lesioned and the unlesioned hemispheres that supports the importance of bihemispheric activity in recovery.

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