

뇌신경재활

게시일시 및 장소 : 10 월 18 일(금) 13:15-18:00 Room G(3F)

질의응답 일시 및 장소 : 10 월 18 일(금) 15:45-16:30 Room G(3F)

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Differences of Leg Motor Excitability by Transcranial Direct Current Stimulation in BDNF Genotype

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Objective

Difference in tDCS effect according to brain-derived neurotrophic factor (BDNF) genotype has been reported in previous stroke studies, however, there is still a lack of enough evidence. This study aimed to investigate the different modulating effect of simultaneous dual-site transcranial direct current stimulation (tDCS) over the primary leg motor cortex (M1leg) and supplementary motor cortex (SMA) in chronic stroke patients according to their BDNF genotype.

Materials and Methods

Twenty chronic stroke patients (7 females; mean age 56±10.2 years) participated in this single-blind, randomized cross-over study. Four conditions were randomly applied with 24 hours of washout period between each condition: dual-site anodal stimulation over the bihemispheric M1leg and SMA; anodal stimulation over the ipsilesional M1leg and SMA; anodal stimulation over the contralesional M1leg and SMA; sham stimulation. Two battery-driven stimulators were used with 2 mA direct current in each anode. Cathodal electrodes were placed on bilateral supraorbital areas. During the 30 minutes of stimulation, patients walked treadmill 10 minutes middle of the stimulation and took rest in the early and late 10 minutes. Blood samples from each patient were genotyped for the BDNF Val66Met polymorphism. Changes of motor evoked potentials (MEPs) were examined before (T0) and immediately after (T1) the stimulation for each condition. A Synergy electromyography (EMG)/evoked potentials (EP) system was used for recording and monitoring of the activity of the contralateral tibialis anterior (TA) muscle. Resting motor threshold (RMT) was defined as the lowest stimulus intensity needed for induction of MEPs of ≥50 μV peak-to-peak amplitude in 5 of 10 consecutive trials. The mean amplitude was obtained by stimulating 10 times with a given RMT at T0. To measure the change of amplitude, the RMT at T0 was equally used at T1.

Results

BDNF genotyping revealed that 15 patients (6 females; mean age 55.5 ± 11.2) were included in Met alleles group and 5 patients (1 female; mean age 57.4 ± 7.3) included in Val/Val group. The MEP amplitude, which is a primary outcome in the study, tended to increase after ipsilesional stimulations in Val/Val subgroup. However, there were no statistical significances. In Met alleles subgroup, the MEP amplitude significantly increased after bihemispheric dual-site stimulation.

Conclusions

Leg motor cortical excitability significantly increased after bihemispheric dual-site stimulation in Met alleles subgroup. This may indicate that patients with Met alleles have a dose-dependent effect by tDCS stimulation which are on line with the results of previous studies. It is the limitation of this study that the sample size is small to show definite differences of tDCS effect by BDNF genotype and stimulation types. Therefore, further studies will be required to generalize the results of this study.

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