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) 15:49-15:53 Room G(3F)

P 2-50

Feasibility of Transcranial Direct Current Stimulation in Patients with Deep Brain Stimulation

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Introduction

Deep brain stimulation (DBS) techniques have been established as an alternative to treat Parkinson's disease (PD). Although DBS has been reported to be effective to ameliorate motor and non-motor dysfunctions, freezing of gait (FoG) is often resistant to DBS. Non-invasive brain stimulation such as repetitive transcranial magnetic stimulation and transcranial direct current stimulation (tDCS) is currently being explored as a safer alternative that can modulate cortical excitability. tDCS has been reported as an alternative therapeutic strategy to ameliorate freezing of gait in PD patients. However, there is no consensus on tDCS in PD patients with DBS. In this case report, we report the effects of cumulative tDCS over the primary motor cortex of the lower leg (M1-LL) to reduce FoG in two cases of PD patients with DBS. We aimed to explore the feasibility of add-on tDCS in PD patients with FoG already undergoing DBS for motor dysfunctions.

Case report

A 74-year-old PD patient (case 1) who had undertaken DBS of the subthalamic nucleus (STN-DBS) 2 years ago visited the outpatient clinic for the further evaluation and proper management for refractory FoG. A 68-year old PD patient (case 2) who had undertaken STN-DBS 4 years ago, was admitted the department Rehabilitation Medicine for refractory FoG. Case 1 was taken 10 times of tDCS for 4 weeks (once every two or three days). In the other hand, Case 2 received daily tDCS for 5 consecutive days. There was no change in dose of the dopaminergic medication during the tDCS period. tDCS was applied using the DC-STIMULATOR MR (NeuroConn GmbH, Ilmenau, Germany). The electrodes were attached to a water-soaked sponge 5 cm × 5 cm in size placed on the scalp. The anodal electrode was placed over M1-L corresponding to 1 cm posterior to Cz as determined by the international 10/20 electroencephalogram system and the cathodal electrode was placed over the right deltoid as extracephalic area. A constant current of 2 mA was administered for 20 min (current density: 0.80 A/m2). In each patient, there was no significant side effect

during and after tDCS. Although freezing of gait-questionnaire (FoG-Q) in case 1 showed no change after 10 times of tDCS, case 2 showed a significant improvement of FoG-Q from 11 to 3 after 5-days of tDCS. In addition, the Timed Up and Go test in case 2 was improved from 18.4 sec to 15.2 sec after the 5-days tDCS.

Conclusion

We present the safety and feasibility of tDCS in PD patients with STN-DBS who showed refractory FoG. This case report demonstrates that the non-invasive brain stimulation such as tDCS, could be a potential add-on therapy to enhance the effects of DBS in PD patients.