Service Priorities and Programmes

Electronic Presentations

Convention ID: 562
Submitting author: Mr KA HEI WONG
Post title: Physiotherapist I, Tuen Mun Hospital

Effects of Non-invasive Brain Stimulation for Upper Limb Rehabilitation in Acute Stroke Patients – A Controlled Clinical Trial

Wong KH(1), Ho LOL(1), Chan MMF(1), Lau KNL(1), Poon PYH(1), To RWK(1), Auw Yang ACN(1), Chow ESL(2), Chu ACK(2), Mak MKY(3)
(1)Physiotherapy Department, (2)Division of Rehabilitation, Department of Medicine and Geriatrics, Tuen Mun Hospital, New Territories West Cluster.
(3)Department of Rehabilitation Sciences, The Hong Kong Polytechnic University

Keywords:
Transcranial Magnetic Stimulation
Transcranial Direct Current Stimulation
Non-invasive Brain Stimulation
Upper Limb Rehabilitation
Acute Stroke
Physiotherapy

Introduction

Number of studies suggested that Non-invasive Brain Stimulation techniques including repetitive Transcranial Magnetic Stimulation (rTMS) and Transcranial Direct Current Stimulation (tDCS) could enhance upper limb functional recovery in chronic stroke patients. However, results obtained in chronic stroke patients are not necessarily similar to those in acute stroke. Thus, a study was conducted in Tuen Mun Hospital (TMH) to evaluate the effects of rTMS and tDCS on upper limb functional recovery in acute stroke patients.

Objectives

To examine the effects of rTMS and tDCS on enhancing upper limb functional recovery in acute stroke patients.

Methodology

Patients diagnosed with Stroke less than 14 days and with wrist and fingers control of Oxford Scale Grade 2 or above were recruited from the Rehabilitation Stroke Unit of TMH. Patients with contraindications to rTMS / tDCS were excluded. Patients were randomly assigned to rTMS, tDCS or control group.
For rTMS group, inhibitory stimulation was conducted to Abductor Pollicis Brevis area of the unaffected hemisphere. Patient received 1200 pulses of 1Hz rTMS at 90% of resting motor threshold. Five consecutive sessions of rTMS together with intensive physiotherapy upper limb training were given. For tDCS group, anodal stimulation by tDCS was conducted to hand area of primary motor cortex of the affected hemisphere. Patient received 1mA tDCS for 20 minutes. Five consecutive sessions of tDCS

together with intensive physiotherapy upper limb training were given. For control group, five sessions of intensive physiotherapy upper limb training were given. The upper-extremity section of the Fugl-Meyer Scale (UE-FM) was used as outcome measure.

Result

Twenty-four patients (17 female and 7 male) were assigned to the rTMS (n=6), tDCS (n=11) and control (n=7) group. The mean age was 65.3 ± 11.1 years old and the mean time between stroke onset and the first UE-FM assessment was 9.25 ± 3.54 days. There was no statistically significant difference in mean age, baseline UE-FM mean score, mean time between stroke onset and the first UE-FM assessment among three groups. ($X2(2)=3.02$, $p=0.221$) ($X2(2)=0.755$, $p=0.686$) ($X2(2)=1.10$, $p=0.577$)

No adverse effects of rTMS or tDCS were reported. For between-group comparison, the changes in mean score of UE-FM in rTMS (17.0 ± 3.8) and tDCS group (16.1 ± 4.9) were significantly larger than that in control group (10.7 ± 4.6) ($U=-2.15$, $p=0.04$) ($U=-2.05$, $p=0.04$), however there was no significant difference between rTMS and tDCS group ($U=-0.3$, $p=0.81$).

Findings of the present study showed that both rTMS and tDCS could augment physiotherapy treatment in enhancing upper limb motor functional recovery in acute stroke patients. These positive findings warrant further investigation of the application of non-invasive brain stimulation techniques to neuro-rehabilitation