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

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OBJECTIVES AND METHODOLOGY

- To examine and compare the effects of rTMS and tDCS on enhancing upper limb functional recovery in acute stroke patients.
- Patients diagnosed with Cerebrovascular Accident (CVA) were recruited from the Rehabilitation Stroke Unit of TMH

**Inclusion criteria**
- Wrist and fingers control of Oxford Scale Grade 2 or above

**Exclusion criteria**
- Unstable medical conditions
- Transient ischemic attack
- Contraindications to rTMS / tDCS
**TREATMENT GROUPS**

**rTMS group (n=9)**
- Inhibitory stimulation was conducted to Abductor Pollicis Brevis area of the unaffected hemisphere.
- Received 1,200 pulses of 1Hz rTMS at 90% of resting motor threshold.
- 5 consecutive sessions of rTMS together with intensive PT upper limb training were given.

**tDCS group (n=11)**
- Anodal (excitatory) stimulation by tDCS was conducted to the hand area of primary motor cortex (M1) of the affected hemisphere through the electrode placed over C3/C4.
- Cathodal electrode was placed over the contralateral supraorbital area.
- Patient received 1mA tDCS for 20 mins.
- 5 consecutive sessions of tDCS together with intensive PT upper limb training were given.

**Control group (n=9)**
- 5 consecutive sessions of intensive PT upper limb training were given.
The mean age was 62.7 ± 12.0 years old and the mean time between stroke onset and the first UE-FM assessment was 9.14 ± 3.30 days.

There was no statistically significant difference in mean age and mean time between stroke onset and the first UE-FM assessment between three groups.

<table>
<thead>
<tr>
<th>Between group comparison</th>
<th>Results</th>
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</thead>
<tbody>
<tr>
<td>rTMS group VS Control group</td>
<td>rTMS has significant effect (p= 0.002)</td>
</tr>
<tr>
<td>tDCS group VS Control group</td>
<td>tDCS has significant effect (p= 0.02)</td>
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<tr>
<td>rTMS group VS tDCS group</td>
<td>No significant difference (p=0.152)</td>
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</table>
Both rTMS and tDCS could enhancing upper limb motor functional recovery

In acute stroke patients!

No adverse effects reported

Positive feedback from patients and doctors!

Warrant further investigation for neuro-rehabilitation

Full of opportunities!