INPLASY

Therapeutic effect of non-invasive brain stimulation for post-stroke upper limb dyskinesias:a Meta-Analysis

INPLASY202420086

doi: 10.37766/inplasy2024.2.0086

Received: 20 February 2024

Published: 20 February 2024

Gao, WY[1]; Wang, PP; Lv, SP[3].

Corresponding author:
Wenyan Gao

2224510736@qq.com

Author Affiliation:
Shandong University of Traditional Chinese Medicine.

ADMINISTRATIVE INFORMATION

Support - No financial sources.

Review Stage at time of this submission - Piloting of the study selection process.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202420086

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 20 February 2024 and was last updated on 20 February 2024.

INTRODUCTION

Review question / Objective To evaluate and compare the effects of repetitive transcranial magnetic stimulation and transcranial direct current stimulation on the patients with post-stroke upper limb dyskinesias.To find a better clinical treatment method to improve the upper limb movement disorder after stroke.

Rationale Upper limb dyskinesias is a common functional disorder after stroke, which can seriously affect patients' daily life and quality of life. As a non-invasive neuroregulation technique, non-invasive brain stimulation is widely used in the treatment of upper limb dyskinesias after stroke because of its safety and effectiveness. Repetitive transcranial magnetic stimulation (rTMS) and transcranial direct current stimulation(tDCS) are more commonly used. Therefore, we will evaluate and compare the safety and efficacy of rTMS and tDCS in patients with upper limb dyskinesias after stroke.

Condition being studied Upper limb dyskinesias is the most common functional disorder after stroke and has a high disability rate. The impact on the patient's daily life and independence is dramatic, limiting their work and social activities. Therefore, early intervention and rehabilitation treatment are very important for patients with upper limb movement disorders after stroke. Conventional rehabilitation methods have low comfort and long cycle, so we need to find a better treatment to help recovery.

METHODS

Search strategy We will searched both Chinese(CNKI,Wanfang,VIP and CBM) and English(PubMed,Embase, Cochrane Library and Web of Science)databases for randomized

controlled trials (from database inception until January 28, 2024).

Participant or population Literature on the use of non-invasive brain stimulation techniques for upper limb motor dysfunction after stroke: including the use of repetitive transcranial magnetic stimulation or transcranial direct current stimulation techniques. Exclusion criteria:1.non-human studies 2.non-randomized controlled trials 3.studies for which valid data could not be extracted 4.non-original studies (letters, reviews, editorials).

Intervention Repetitive transcranial magnetic stimulation (rTMS) or transcranial direct current stimulation (tDCS).

Comparator Sham stimulation or placebo or blank control.

Study designs to be included Randomized controlled trials (RCT).

Eligibility criteria Literature on the use of non-invasive brain stimulation techniques for upper limb motor dysfunction after stroke: including the use of repetitive transcranial magnetic stimulation or transcranial direct current stimulation techniques. Exclusion criteria:1.non-human studies 2.non-randomized controlled trials 3.studies for which valid data could not be extracted 4.non-original studies (letters, reviews, editorials).

Information sources We will searched both Chinese(CNKI,Wanfang,VIP and CBM) and English(PubMed,Embase, Cochrane Library and Web of Science)databases for randomized controlled trials (from database inception until January 28, 2024).

Main outcome(s) Fugl-Meyer Assessment (FMA-UE) and Modified Barthel Index(MBI).

Additional outcome(s) Action Research Arm Test(ARAT) and Wolf Motor Fuction Tesa(WMFT) and National Institute of health stroke scale(NIHSS).

Data management Two researchers independently performed data extraction, which mainly included the study characteristics (title,first author, publication year, language of publication), participant characteristics (sample size, sex, and mean age,country), intervention program (treatment method, frequency, intensity, number of treatment sessions, treatment duration), and outcome index (primary outcome: FMA-UE,MBI; secondary outcome: ARAT,WMFT and NIHSS).

Quality assessment / Risk of bias analysis Two reviewers independently assessed the bias of the included studies according to the Cochrane Handbook for Systematic Reviews of Interventions, and disagreements were resolved by discussing with the third reviewer. The assessment items included selection bias, performance bias, detection bias, attrition bias, reporting bias, and other biases. Each item was rated as "high", "low", or "unclear".

Strategy of data synthesis We used RevMan 5.4 to perform the meta-analysis.We used the Cochrane Q statistic to qualitatively determine whether heterogeneity existed among the included studies (test level α=0.05), while the I^2 statistic to quantitatively determine the magnitude of heterogeneity. If $P \geq 0.1$ and $I^2 \leq 50\%$, the heterogeneity was considered to be insignificant and we selected the fixed-effects (FE) model. Conversely, we selected the random-effects (RE) model.The results for the continuous variables were expressed as standardized mean differences (SMDs) with 95% confidence intervals (CIs).

Subgroup analysis In this meta-analysis, the subgroup analysis includes comparison between rTMS and tDCS.

Sensitivity analysis Sensitivity analysis was carried out in RevMan 5.4 software to reflect the sensitivity of the article by the change of effect size after deleting one of the articles.

Country(ies) involved China.

Keywords stroke;upper extremity motor function;activities of daily living;non-invasive brain stimulation;repetitive transcranial magnetic stimulation;transcranial direct current stimulation;randomized controlled trial; meta-analysis.

Contributions of each author
Author 1 - Wenyan Gao.
Author 2 - Peipei Wang.
Author 3 - Shaoping Lv.