Role of repetitive Transcranial magnetic stimulation in functional recovery of post ischemic stroke dysphasia

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Abstract

Objective: the aim of this study was to throw light on the different types of aphasia which can associate cerebrovascular ischemic stroke in a sample of stroke patients admitted to Ain shams university and Ain shams university specialized hospitals, and to evaluate the role of repetitive transcranial magnetic stimulation as a non invasive brain stimulation therapy in functional recovery of these dysphasic disorders.

Method: total of 60 post cerebrovascular ischemic stroke aphasic patients in subacute phase (1-3 months) divided into 3 equal groups were included in the study, group A were subjected to stimulatory repetitive transcranial magnetic stimulation on dominant language areas, group B were subjected to inhibitory repetitive transcranial magnetic stimulation on non dominant language homologue areas, group C were subjected to sham repetitive transcranial magnetic stimulation, aphasia subclass was diagnosed based on western aphasia battery, functional improvement was assessed by stroke aphasia quality of life 39 scale, communication items of stroke aphasia quality of life 39 scale and stroke aphasia depression questionnaire after 4 daily successive sessions

of transcranial magnetic stimulation (1 week), after another 4 daily successive sessions (2 weeks) and after 1 month from enrollment into the study.

Results: both active groups showed considerable positive results to repetitive transcranial magnetic stimulation compared to sham group on the 3 used scales, on further analysis of results based on rate of change, group B response was better than group A in global, receptive, transcortical aphasia subclasses, while group A was better in anomic aphasia, neither was superior to another in expressive subclass.

Conclusion: the current study showed that rehabilitating aphasic patients using transcranial magnetic stimulation in the subacute phase is of value whether through inhibitory electromagnetic waves on homologue language areas or through stimulatory waves on language dominant areas.

List of abbreviations

AF	Arcuate fasciculus
AF	Atrial fibrillation
AHCPR	Agency for health care policy and research
aSMG	Anterior supramarginal gyrus
BA	Broadmann area
BDNF	Brain derived neurotrophic factor
CT	Computed tomography
DBS	Deep brain stimulation
DLPFC	Dorsolateral prefrontal cortex
DM	Diabetes mellitus
EEG	Electroencephalogram
F7	Left frontal area 7 on international EEG system
F8	Right frontal area 8 on international EEG system
fMRI	Functional magnetic resonance imaging
GABA	γ-aminobutiric acid
HDL	High density lipoprotein
HRQL	Health related quality of life
HS	Highly significant
Hz	hertz
IDF	International diabetes federation
IPG	Internal pulse generator
LH	Left hemisphere
MEP	Motor evoked potential
MRI	Magnetic resonance imaging
MT	Motor threshold
MTG	Middle temporal gyrus
N	Number

NBS	Non invasive brain stimulation
NCCEA	Neurosensory center comprehensive examination for aphasia
NIHSS	National Institute of Health Stroke Scale
NS	Non significant
PET	Positron emission tomography
PF	Parietal area
PFG	Posterior supramarginal gyrus
PG	Angular gyrus
Pop	Pars opercularis
PTr	Pars triangularis
RCT	Randomized controlled trail
RCTs	Randomized controlled trials
RH	Right hemisphere
rTMS	Repetitive transcranial magnetic stimulation
rTPA	Recombinant tissue plasminogen activator
SADQ-21	Stroke aphasic depression questionnaire
SADQ-H	Stroke aphasic depression questionnaire hospital version
SAQOL-39	Stroke aphasia quality of life 39 scale
SCD	Skull cortex distance
SD	Standard deviation
SIGN	Significant
SLF	Superior longitudinal fasciculus
SLT	Speech and language therapy
SMA	Left supplementary motor area
STG	Superior temporal gyrus
STG	Superior temporal gyrus

STS	Superior temporal sulcus
T7	Left temporal area 8 on international EEG system
T8	Right temporal area 8 on international EEG system
tDCS	Transcranial direct current stimulation
TG	Triglycerides
TMS	Transcranial magnetic stimulation
VHS	Very highly significant
VNS	Vagal nerve stimulation
WAB	Western aphasia battery
WHO	World health organization

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