Repetitive transcranial magnetic stimulation with disorders of consciousness: a sham-controlled randomized double-blind study protocol

Audrey Wolff1,2, Martin Rosenfender3,4, Masachika Niimi1, Leandro Sanz1, Steven Laureys1, Andreas Bender3,4, Olivia Gosseries1

1 GIGA-Consciousness, Coma Science Group, University of Liège, Belgium | 2 Faculty of Medicine and Life Sciences, Hasselt University, Hasselt, Belgium | 3 Department of Neurology, Therapiezentrum Burgau | 4 Neurological Clinic and Polyclinic, Großhadern Hospital, Ludwig-Maximilian-Universität

Introduction

Few existing treatments for patients with disorders of consciousness (DOC)

➢ rTMS = non-invasive method that induces changes in cortical neuronal excitability

➢ DOC patients1:

- Coma
  - No eye opening
  - Reflex behavior

- Unresponsive Wakefulness Syndrome (UWS)
  - Eye opening
  - Reflex behavior

- Minimally Conscious State (MCS)
  - Eye opening
  - Non reflex behavior

Hypothesis: high frequency rTMS pulses on the left prefrontal cortex will significantly increase neurobehavioral functioning

Methods

POPULATION
10 UWS patients and 10 MCS patients
Diagnosis based on 5 Coma Recovery Scale – Revised2 (CRS-R)

MULTICENTRIC STUDY
1. Coma Science Group (Belgium)
2. Therapiezentrum Burgau (Germany)

2 BLIND EXAMINERS
Examiner A : CRS-R
Examiner(s) B: rTMS sessions

2 SESSIONS
Minimum 48h apart
1 SHAM
1 REAL

rTMS
Nexstim or Deymed
Left prefrontal cortex

Neuronavigation based on individual T1

CRS-R
30 min

RESTING STATE
256 EGI Geodesics
15 min

Intensity: 90% rMT, Frequency: 10 Hz

1. Trains of 50 stimulations in 5 s
2. Repeated 20 times with an interval of 20 s
≈ 1000 pulses ≈ 8 min and 20 s

Bibliography:

awolff@uliege.be