Cortical Ischemic Stroke and Serotonin (CISS)

Effects of serotonergic neuromodulation on behavioural recovery and motor network plasticity after cortical ischemic stroke: a longitudinal, placebo-controlled study

Principal Investigator:	PD Dr. med. Georg Kägi
Status:	ongoing, recruiting
Project Start:	2017
Project End:	2021
Trial Design/Class:	national, randomized, double blind, placebo-controlled, longitudinal Trial; Class B (ClinO)
Number of Patients:	50 total (25 Kantonsspital St.Gallen, 25 Universitätsspital Bern)
Centers:	2 (Kantonsspital St.Gallen, Universitätsspital Bern)
Sponsor/Partner:	Universitätsspital Bern / Prof. Dr. med. Roland Wiest
Funding:	Universitätsspital Bern, Swiss National Science Foundation

Summary:

The neuroplasticity of the human brain is essential for recovery in sensorimotor deficiency following ischemic cerebral infarction. Studies have shown that long-term use of selective serotonin reuptake inhibitors (SSRIs) has a positive impact on rehabilitation capacity. Serotonin modulates excitatory glutaminergic neurotransmission and induces long-term potentiation of synaptic transmission. This is necessary for the efficient learning of sensorimotor functions and reorganization of the synapses in the area of the damaged cortex.

Patients with first-time ischemic brain infarction in the area of the pre- / postcentral gyrus and hand paresis will take escitalopram / placebo once a day for 3 months. The follow up is 6 months. The following parameters are examined: standardized score scores for behavioral data, precision of hand movement and strength including kinematic measurements, long-term potentiation by repetitive transcranial magnetic stimulation (rTMS), BOLD-fMRI, magnetic resonance spectroscopy (MRS), serum levels of escitalopram and CYP2C19 or ABCB1 gene polymorphism.

Objectives

Primary:

- to measure the effects of oral Escitalopram administration on behavioural recovery by tracking skilled hand function over the first nine months
- to measure the associated patterns of BOLD response and GMV change in the sensorimotor network with special focus on the perilesional GMV
- to provide mechanic insight into human post-stroke neuroplasticity by correlating BOLD and GMV changes directly with behavioural scores, kinematic measures of hand function and physiological measures of movement-related effort.

Secondary:

- to longitudinally measure electrophysiological markers of neuroplasticity (through rTMS) and local glutamatergic neurotransmission (through MRS) and to assess the relationship of these markers with BOLD response and grey matter volume change.