Changes in Neuroplasticity Following Intensive Rehabilitation of Aphasia and/or Apraxia of Speech

NCT ID:
Date: 2020-09-11

Statistical Analysis Plan (SAP)

Changes in Neuroplasticity Following Intensive Rehabilitation of Aphasia and/or Apraxia of Speech

Principal investigator	Ellika Schalling Associate professor Division of Speech-Language Pathology, Department of Clinical Science, Intervention and Technology, CLINTEC, Karolinska Institutet Stockholm, Sweden
ClinicalTrials.gov identifier	
Author	Marika Schütz Ph.D student Division of Speech-Language Pathology, Department of Clinical Science, Intervention and Technology CLINTEC, Karolinska Institutet Stockholm, Sweden
Version	Draft 0.2

This statistical analysis plan (SAP) will give more detailed descriptions of the endpoints in the study and the corresponding analyses.

Abbreviations

AOS	Apraxia of Speech
SLP	Speech Language Pathologist
fMRI	Functional magnetic resonance imaging

1. Introduction

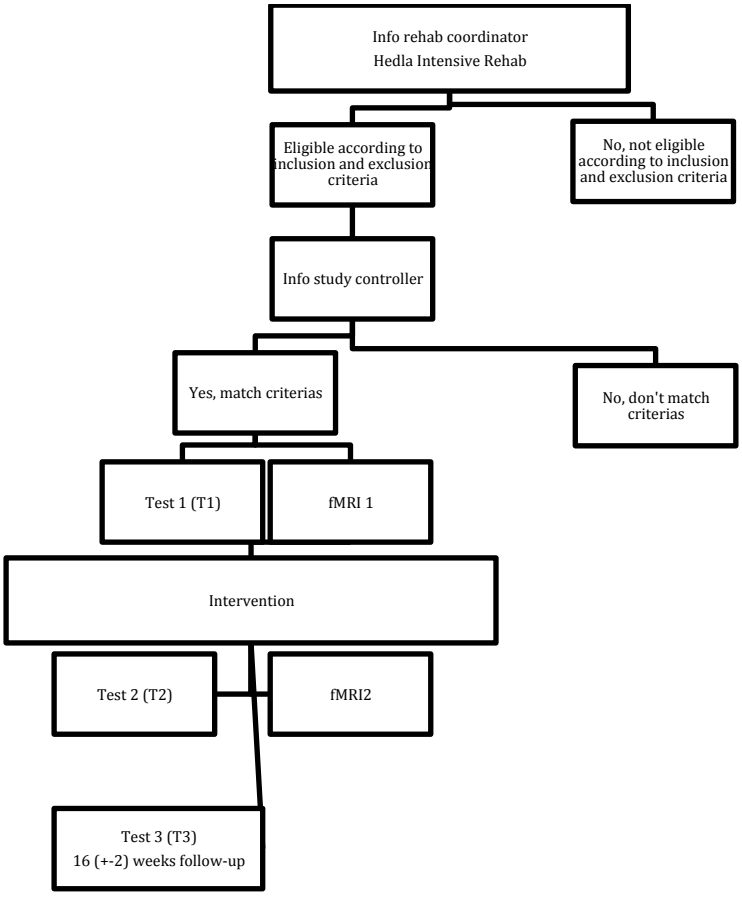
The aim of this project is to investigate in a single-centre open label clinical trial, the short- and long-term effects of two weeks of an intensive speech-language pathology intervention combined with physiotherapy on aphasia and apraxia of speech (AOS), by studying changes in speech-language and communication (primary outcome measure), and cognition and quality of life (secondary outcome measures) and correlate the changes to structural and functional neuroplasticity changes (primary outcome measure) in thirty persons with chronic stroke.

2. Study design

30 study participants (age 18-75) with aphasia and/or AOS at least 7 months post stroke will be recruited consecutively from participants enrolling in Hedla's intensive aphasia rehabilitation program. Exclusion criteria are history of dementia or severe loss of sight or hearing -fMRI (Functional magnetic resonance imaging) incompatible implants or claustrophobia. Testing of speech (TAX, SkaFTA), language (CAT, BNT), cognition (BNIS), communication (COAST) and quality of life (COAST) and scanning with resting state fMRI will be performed directly before (T1) and after 10 days of intensive therapy (T2) with an additional follow-up 16 (+-2) weeks (T3) after the intervention with behavourial tests and additional self-evaluating Goal Attainment Scales (GAS) on the ICF-dimensions function, activity and participation.

The study is a single-group open label study during five years. Participants aiming to engage in a minumum of 3 hours of speech-language therapy with additional physiotherapy during a minimum of ten days matching the inclusion criteria will be recruited consecutively.

Figure 1 Flowchart of inclusion and testing procedure



2.1 Sample size calculation

The population size of people living with aphasia and/or AOS eligible for intensive treatment is calculated to 50 000, approximately 0,5 % of 10 million Swedes. A sample size of 19 or more are needed to have a confidence level of 95% that the real value is within ±10% of the measured/surveyed value. The estimated number of participants expected to enroll in the intensive treatment and to qualify as participants according to inclusions- and exclusion criteria as well as giving consent to participate in the study during the time period are estimated to 30 participants.

3. Aims and objectives

The present study aims to investigate the short- and long-term effects of two weeks of intensive speech-language pathology intervention combined with physiotherapy on aphasia and AOS and their neural correlates in thirty persons with chronic stroke.

4. Primary Outcomes

Comprehensive Aphasia Test, CAT (in pilot Swedish test A-ning)
[Time Frame: 2 weeks between T1 and T2 and additional follow-up after 16 weeks]

Boston Naming Test, BNT
[Time Frame: 2 weeks between T1 and T2 and additional follow-up after 16 weeks]

Test for Apraxia of Speech, TAX
[Time Frame: 2 weeks between T1 and T2 and additional follow-up after 16 weeks]

The Swedish version of Apraxia of Speech Rating Scale, SkaFTA
[Time Frame: 2 weeks between T1 and T2 and additional follow-up after 16 weeks]

Communication Outcome After Stroke, COAST
[Time Frame: Directly before and after intervention and additional follow-up 16 weeks (+-4) post intervention]

Resting state fMRI 45 minutes resting state scanning
[Time Frame: Directly before and after intervention]

Secondary Outcomes

Goal Attainment Scaling, ICF GAS scales for self-evaluation of language functions, participation, activity and autonomy
[Time Frame: 16 weeks (+-4) post intervention]

BNIS
BNI Screen for Higher Cerebral Functions
[Time Frame: Directly before and after intervention]

Safety outcomes
All serious events that affect the participation in the study are reported to the principal investigator Ellika Schalling, professor Marcelo Berthier at Cimes and to Stefan Andersson, head of the board, Hedla Intensive Rehab AB. The subjects' safety is monitored through the responsible medical doctor at the program.
Anna Sjöholm, rehab director will identify and report possible adverse event, if she is not at the site the team-leader at site will take on this responsibility. All participants receive safety information before performing the study. Marika Schütz will perform a safety monitoring before the participants enroll in the program. All actions are regulated by the regular healthcare.

5. Populations
Participants will be consecutively recruited from a live-in rehabilitation center offering intensive speech-language intervention to individuals with chronic aphasia and/or AOS following stroke or other neurological injury such as traumatic brain injury. Age 18 to 75 years, minimum 6 months post stroke, chronic aphasia and/or AOS diagnosed by a speech and language pathologist. Exclusion criteria: Severely impaired vision and/or hearing

preventing participation in rehabilitation, documented symptoms of cognitive disease and presence of metal implants or severe claustrophobia preventing the MRI-scanning.

Subgroups
No subgroups.

6. Analyses
Primary outcome
The primary outcome analyses are the difference in test results and structural and functional plasticity before and after the intensive treatment. To obtain sufficient statistical power to detect a clinically significant effect size, we use the standard deviation and median in those tests that have been validated, in those cases standard deviation and median are missing we use 10 % improvement, primarily between T1 and T2.

Voxel based morphometry analyses as well as resting state functional connectivity analyses will be completed to assess both structural and functional changes following intervention. All neuroimaging data and analyses will be performed at Malaga University in collaboration with Professor Marcelo Berthier and Dr Núria Roé-Vellvé. Statistical analyses of treatment effects will primarily be performed with tests for repeated measurements (for example ANOVAs or Friedman's test for non-parametric data. Conventional methods to report effect sizes will be used. Speech-language testing will be done by a different SLP than the clinician giving the intervention and testing will be filmed to allow analysis of inter- and intrarater reliability.

Missing data
Missing data, patients dropping out or non-response to surveys or test, will be clearly stated when presented and the data will be accessible via the repository Swedish National Data Service.