Subthalamic nucleus in cognitive control and inhibition

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In the present study, we investigate the role of the STN in different conditions.In earlier research, we found that the STN is involved in response selection and inhibition. This was investigated using behavioral measurements. Currently, we want to...

Ethical review	Approved WMO
Status	Pending
Health condition type	Movement disorders (incl parkinsonism)
Study type	Observational non invasive

Summary

ID

NL-OMON33300

Source
ToetsingOnline

Brief title
Subthalamic cognition and inhibition

Condition

- Movement disorders (incl parkinsonism)

Synonym
Parkinson's disease

Research involving
Human

Sponsors and support

Primary sponsor: Academisch Medisch Centrum
Source(s) of monetary or material Support: Reiskosten worden betaald uit eigen zak van de onderzoeker in Tilburg en misschien door de Parkinsonvereniging

Intervention

Keyword: Cognition, Inhibition, STN

Outcome measures

Primary outcome

Mechanisms of cognitive control and inhibition

a. simple RT-task, a single stimulus is presented and the subject has to respond by pressing a button as soon as possible

b. choice RT-task, a light on the left or the right side of the monitor shows up and the the subject has to press a button as soon as possible ipsilateral to the stimulus presented

c. GO/NOGO task, after a warning stimulus a GO-stimulus (e.g. green light, press the button) is presented or a NOGO stimulus (e.g. red light, do not press the button)

d. STOP-task, similar to the preceding GO/NOGO task, but some of the GO stimuli (e.g. green light) will directly be followed by an overrulling STOP stimulus (e.g. red light)

Perception of emotional expression and body-language

Patients are placed within a Faraday cage in front of a monitor. The monitor shows simultaniously faces with various expressions. The patient has to decide and subsequently indicate with a button press which faces are showing a similar expression. In a comparable task, instead of faces pictures of bodies are used.

Subjects have to decide which bodies have a similar emotion value.

Motoric and sensoric timing

In a tapping task, where a number of clicks are presented in a fixed rhythm, the patient is asked to tap according to the auditory stimuli and after discontinuation of the auditory stimuli, he or she has to continue tapping in the rhythm.
Next a discrimination task will be excecuted. Two small light are presented with variabel intervals. The first light will flash 500ms, 1000ms, or 1500ms. The second may shorter, identical, or longer and the subject has to decide which is the case.

Secondary outcome

Not applicable

Study description

Background summary

Neuropsychology tries to relate behavior and the function of relevant brain structures. In general, normal subjects or patients participate in neuropsychological research. In addition, systematic research in animals (including primates). These consist of intracortical measurements of brain activity during the performance of various tasks. In some laboratories intracortical recordings during different simple motor tasks (e.g. finger movements) are also done in patients with epilepsy. In the present study, behavioral and electrophysiological recordings are made in patients with Parkinson's disease and deep brain stimulation of the STN.

Study objective

In the present study, we investigate the role of the STN in different conditions.

In earlier research, we found that the STN is involved in response selection and inhibition. This was investigated using behavioral measurements. Currently, we want to investigate whether there is a brain cortex correlate.

In addition, we want to study whether the perception of emotion in patients with Parkinson's disease is impaired. This has been demonstrated for the perception of angry faces, but not yet for somatic expressions nor for context effects.

It is hypothesized that the nigro-striatal projection functions like a pacemaker for the estimation of time-intervals. Disturbances of the basal ganglia may result in a impaired estimation and impaired generation of time-intervals. Dopamine deficiency may cause a disruption of this pacemaker function, as was shown before by the improvement of timing with the precursor levodopa substitution. To date, the effect of deep brain stimulation of the STN upon time estimation has not been investigated.

Study design

Two outcome parameters will be used.

1) behavior
Several tasks will be presented, assessing speed and accuracy of reactions. These are variants of reaction-time tasks.

2) electrophysiology
Electro-cortical brain (EEG) and, if necessary, the electrical muscle activity (EMG) will be measured. Of special interest are the event-related potentials (ERPs), which will be derived from the EEG.

Study burden and risks

Apart from the time invested by the patients, there is no extra burden. Patients can turn the deep brain stimulation OFF and ON by themselves; this is without risks. If the stimulator is turned OFF, patients may experience the return of symptoms which the deep brain stimulation supresses. These will disappaer when turning ON the stimulator. The study does not have any risks.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

Patients with parkinson's disease
bilateral STN deep brain stimulation

Exclusion criteria

below normal intelligence
severe motoric disturbances

Study design

Design

Study type: Observational non invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Pending
Start date (anticipated):	20-04-2009
Enrollment:	20
Type:	Anticipated

Ethics review

Approved WMO

Application type:	First submission
Review commission:	METC Amsterdam UMC

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL26846.018.09