Elucidating the therapeutic mechanism of DBS

No registrations found.

Ethical review	Positive opinion
Status	Recruitment stopped
Health condition type	-
Study type	Interventional

Summary

ID

NL-OMON21978

Source
Nationaal Trial Register

Brief title
OCDBD

Health condition

Obsessive-compulsive disorder

Sponsors and support

Primary sponsor: Board of Directors, Academic Medical Center, Amsterdam
Source(s) of monetary or material Support: Medtronic Inc, devices in kind

Intervention

Outcome measures

Primary outcome

1. DBS-related changes in amplitude, phase stability and cortocostriatal connectivity of theta (~4 Hz), alpha (~10 Hz) and gamma (>40 Hz) EEG oscillations at electrode contacts and scalp
2. Amplitude, phase stability of theta, alpha and gamma EEG oscillations measured at the electrodes that prelude and accompany the emergence of a compulsive episode during real-

life situations and in experimental settings
3. DBS-related clinical changes on clinician-rated questionnaires:
- Yale Brown of Obsessive-Compulsive Scale (Goodman et al., 1989)
- Hamilton Scale for Depression (Hamilton, 1960)
- Hamilton Anxiety Scale (Hamilton, 1959)
- Symptom provocation during IAPS picture task (Bradley

Secondary outcome

1. Characterictics of corticostriatal EEG oscillations that are associated with various cognitive and behavioral paradigms and with sleep.
2. Written diary of OCD symptom experiences and daily activities
3. Demographic information not obtainable for clinical file (e.g. handedness)

Study description

Background summary

Rationale: Deep Brain Stimulation (DBS) of the ventral part of the anterior internal capsule (vALIC) is an effective treatment for patients with otherwise treatment-refractory obsessive-compulsive disorder (OCD) (Denys et al 2010). DBS has been utilized in approximately 250 OCD patients worldwide, including 48 patients treated at our department. DBS for OCD shows a response rate of 60% in open and sham-controlled studies (Bais et al 2014). However, the high variability among patients and clinical response patterns has made it difficult to gain systematic insight into the optimal neurosurgical target and stimulation settings. At present, stimulation parameters are based on clinical feedback and previous experience with other patients, which is time-consuming, inefficient and subjective. A quantitatively driven approach to tailor stimulation parameters is urgently needed for more effective and efficient clinical treatment. Preliminary work by our group indicates that neural changes in the frontostriatal network are essential for efficacy of DBS. Recently we acquired prototype bi-directional brain radio devices that not only stimulate but also record activity from the targeted brain structure. We propose to use these unique devices in select patients already implanted with or eligible for DBS electrodes, in order to develop more effective and systematic stimulation DBS parameters. Moreover, these devices will also afford us the possibility to get a greater understanding of the neural pathophysiology of OCD that can be targeted with DBS and other treatment modalities, by allowing us to monitor the brain activity of patients as they experience symptoms in daily life situations.

Objective: Our primary objective is to correlate symptom changes and changes in cognitive functions with frontostriatal responses at different DBS settings, by simultaneously recording local and network EEG activity at the electrodes and scalp. Our secondary objective is to decode ‘’signatures’’ of activity from the electrode before and during OCD attacks by analyzing its activity while patients are experiencing symptoms during a personal tailored experiment and in daily life situations.

Study design and population: Observational cohort study in 12 OCD patients that are in need of battery replacement or are eligible for a first DBS implantation. Instead of a regular neurostimulator, these patients will receive a bi-directional brain radio device. We will use this device to record DBS-related neural changes over a period of 6 months, which will be correlated with relevant clinical changes.

Main study parameters/endpoints: Primary endpoints: 1. DBS-related changes in EEG amplitude, phase stability and corticostriatal connectivity measured at the electrode contacts and scalp. 2. Amplitude and phase-stability of EEG oscillations measured at the DBS contact sides before and during OCD symptoms in real-life situations and in experimental setting. 3. DBS-related clinical changes (including obsessions, compulsions, anxiety and depression) on clinician-rated and self-reported questionnaires and during symptom provocation. Secondary endpoints: Characteristics of corticostriatal EEG oscillations that are associated with various cognitive and behavioral paradigms and with sleep.

Study objective

This is an exploratory pilot study without specific hypotheses.

Study design

Baseline (before surgery)
Visit 1 (before turning on DBS): baseline intracranial recording
Visit 2 (random sequence of different voltages, between 3-5V): intracranial and external EEG recordings at different voltages + resting state EEG
Visit 3 (on / off): Confidence task, Symptom provocation task
Visit 4 (on / off): Confidence task, Symptom provocation task, Social task
Visit 5 (on / off): Stop-signal, Emotion task, Libet task
Visit 6 (on / off): Stop-signal, Emotion task, Libet task, Social task
Visit 7 (on / off): Subliminal perception

Intervention

Deep brain stimulation of the ventral anterior limb of the internal capsule

Contacts

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Eligibility criteria

Inclusion criteria

Subject has provided informed consent.
Primary diagnosis of OCD with DBS-implantation performed in the AMC in the previous years.
Primary diagnosis of OCD and indicated for DBS-implantation in the AMC.
DBS-treatment responsiveness, defined as an improvement in Y-BOCS of >35% at last follow-up compared to pre-surgical baseline.

Exclusion criteria

Subject is unwilling or unable to comply with all study-required follow-up evaluations.
Alcohol or substance abuse during last 6 months.

Study design

Design

Study type:	Interventional
Intervention model:	Crossover
Allocation:	Randomized controlled trial
Masking:	Double blinded (masking used)
Control:	Placebo

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	11-06-2015
Enrollment:	11
Type:	Actual

IPD sharing statement

Plan to share IPD: No

Ethics review

Positive opinion

Date:	31-01-2019
Application type:	First submission

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
NTR-new	NL7486
Other	METC AMC : METC 2015-065

Study results