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Biomedical Research Unit: Acute and Chronic effects of transcranial Direct Current stimulation in Lewy body dementia patients

Submission date
25/10/2013

Recruitment status
No longer recruiting

Registration date
25/10/2013

Overall study status
Completed

Last Edited
21/01/2019

Condition category
Nervous System Diseases

[X] Prospectively registered

[_] Protocol

[_] Statistical analysis plan

[X] Results

[_] Individual participant data

Plain English summary of protocol

Background and study aims
People with Lewy body dementia or Parkinsons often experience visual hallucinations (when someone sees things that don't exist outside their mind) and problems with how they perceive things. These symptoms can be very distressing. Currently we dont have any really effective treatments for the visual problems that people with Lewy body dementias or Parkinsons experience. We are keen to test a new treatment called direct current stimulation, which involves passing a weak electric current between two pads on a persons scalp. We know that this treatment appears to improve hallucinations (hearing voices) in people with schizophrenia, but we dont know if it will help people who experience visual hallucinations. Therefore we plan on giving people with Lewy body dementia and/or Parkinsons disease either an active treatment (direct current stimulation) or a placebo (a dummy treatment) to see if this new treatment can help reduce visual hallucinations and improve visual function.

Who can participate?
People with Lewy body dementia and/or Parkinsons disease.

What does the study involve?
The treatment study consists of a number of different steps: On the first occasion participants will be asked some questions about their general health and mood. Participants will complete some short memory tests and vision tests, as well as some short attention tests on a computer. This appointment would last about two hours and will take place in participant homes. As part of this assessment we would also like to ask a close relative or carer of a participant some questions about their health and memory. We will then ask participants to attend the Clinical Ageing and Research Unit (CARU) for the treatment on Day 1. On Day 2 to Day 4 we will give the treatment in participant homes or in CARU, depending on participant preference. Participants will be randomly allocated to receiving either the active treatment or a placebo treatment. The direct current stimulation treatment will consist of applying two sticky electrode pads to the back of the head. Participants will have the stimulation treatment for 20 minutes and will have a break before another 20 minute stimulation treatment. During the treatment participants will be asked to relax and close their eyes, and can listen to some music if they wish. Participants will

also undergo some computerised testing of vision and attention before and after the treatment. The treatment will generally be done across a working week, starting on Monday, going through to Thursday. Stimulation treatments will be done on each of these days. On the Friday (Day 5) participants will come back to CARU for a final assessment of vision and memory and we will ask if there have been any improvements in visual hallucinations. We will also ask that on this occasion, a carer or family member is able to come to answer some questions regarding the participants hallucinations and how they have been over the previous few days. On the first day of the treatment (Day 1) as well as the on the Friday (Day 5) participants will undergo an additional assessment called transcranial magnetic stimulation. This technique involves placing a special magnetic device against the back of the head. This activates the visual part of the brain and sometimes makes participants see brief flashes of light. We do this test so that we can directly see whether or not the direct current stimulation treatment has changed the activity levels of the visual part of the brain. We are keen to know if there is any treatment benefit with direct current stimulation treatment and whether this effect continues after the treatment. For this reason, we will come and visit participants one month and three months after treatment. We will ask participants and a carer/family member if there have been any changes in visual hallucinations. We will also repeat some of the memory and computer tests from before.

What are the possible benefits and risks of participating?
We are trying to find out whether treatment with direct current stimulation reduces hallucinations and improves visual function, for study participants and for people with similar problems to participants. Thousands of people world-wide have undergone direct current stimulation without any major side effects. Some people experience a tingling sensation with the stimulation and a temporary reddening of the skin under the sites where the pads are placed. Very occasionally, some people may experience a short lasting headache. Rarely some people have reported feeling sick, have had problems sleeping or difficulties with their concentration. Some people are also allergic to the electrode pads but we would check whether participants have had any problems with skin allergies before being entered into the study. Participants will also undergo transcranial magnetic stimulation on two occasions, which is a test to measure the activity of the vision part of the brain. This test is well-tolerated, although rarely some people may describe the sensation of the stimulation as uncomfortable. Very occasionally, some people may experience a headache. There have been very occasional reports of the test causing a seizure, but this only seems to have happened in people who have a history of seizures. We will check whether any participants are at risk of having a seizure or epilepsy before they undergo this test.

Where is the study run from?
The study will be run from the Clinical Ageing Research Unit (CARU) at Newcastle University and in participant homes.

When is the study starting and how long is it expected to run for?
November 2013 to March 2017

Who is funding the study?
National Institute for Health Research (UK)

Who is the main contact?
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Contact information

Type(s)
Scientific

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Protocol serial number
15482

Study information

Scientific Title
Biomedical Research Unit: Acute and Chronic effects of transcranial Direct Current stimulation in Lewy body dementia patients (BRU ACDC-Study)

Acronym
BRU ACDC

Study objectives
In Lewy body dementias (LBD) complex, recurrent visual hallucinations (VH) and problems with how one perceives things visually are common and distressing symptoms. Existing drug treatments for these are often not effective and indeed the side effects from these drugs (especially antipsychotics) can be severe. Therefore there is an urgent need to develop new and effective treatments.

We have previously found that the frequency and severity of visual hallucinations in LBD is associated with the excitability of the visual cortex and we know that a posterior part of the brain, called the parietal cortex appear to be less active in LBD and this may contribute to the visual and perception difficulties and the visual hallucinations that patients experience.

Transcranial direct current stimulation (tDCS) is an established, non-invasive and well tolerated technique which is known to alter the activity or excitability levels of the brain (either increase it or decrease it) by the attachment of two soft electrode pads to the scalp which pass low intensity current between them.

In the proposed study we will recruit LBD patients with moderate to severe hallucinations to a pilot double blind randomised control trial of tDCS where they will either receive active tDCS or placebo treatment over the course of several days. They will undergo baseline assessments of

their function and visual hallucination severity and will be followed up immediately after their treatment and then at one month and at three months to see if there are any sustained treatment benefits. We will also use a technique (at baseline and follow-up called transcranial magnetic stimulation (TMS) to test if there are visual excitability changes as a result of the tDCS.

This is a pilot study; if there are positive effects seen then we would aim to devise a larger, multicentre trial.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Leeds West Research Ethics Committee, 07/11/2013, 13/YH/0292

Study design
Randomised interventional treatment trial

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Topic: Dementias and Neurodegenerative Diseases Research Network; Subtopic: Dementia; Disease: Lewy Body Dementias

Interventions
Transcranial Direct Current Stimulation (tDCS). This involves the application of a weak electrical current (<2mA) between two scalp surface electrodes. Participants will either receive active or sham (placebo) tDCS treatment on the basis of prior randomisation (1:1 allocation to active treatment:sham/placebo) and electrodes will be applied to the scalp overlying the parietal cortex and visual cortex. The treatment (2 x 20 minute sessions with a 30 minute break) will be delivered over four consecutive days.

Intervention Type
Procedure/Surgery

Primary outcome(s)
1. The acute benefits of tDCS treatment on visual hallucinations at Day 5
2. The chronic benefits of tDCS as assessed at one and three months.
The measure used for the severity and frequency of visual hallucinations will be the composite score derived from question 2 of the neuropsychiatric inventory (NPI). This measure normally assesses hallucination occurrence over the previous month, so the question will be modified for the acute assessment (Day 5) to ask about hallucination frequency and severity over the 4 days of treatment.

Key secondary outcome(s))
1. The Neuropsychiatric Inventory (NPI) hallucinations subscale will be used to assess maintenance of any benefit at 3 months follow-up. Two other visual hallucination scales (NEVI-H and the Neuropsychiatric Inventory Clinician (NPI-C) hallucination severity score) will be used as

secondary measures of visual hallucinations at each of the assessment time points (Day 5, 1 month and 3 months).
2. Other secondary measures will include changes in visuo-perceptual function (following treatment), global measures of neuropsychiatric symptom severity (NPI), as well as cognitive and quality of life indexes. The clinician global impression of scale change will also be used as a general marker of improvement or deterioration at 1 month and 3 months. As a biomarker measure of response, the repeat phosphene excitability measure at Day 5 will be compared to the baseline and against any improvements in visual hallucinations.

Completion date
01/03/2017

Eligibility

Key inclusion criteria
1. Age > 60, either sex
2. Provision of written informed consent or, if lacking capacity, consent provided by legal or other appropriate representative in accordance with provisions of the 2005 Mental Capacity Act
3. Absence of concurrent major psychiatric illness (e.g. major depression)
4. Absence of severe physical illness or comorbidity that may limit ability to fully participate in study
5. Sufficient English to allow assessment scales and cognitive testing

For Lewy body dementia participants:
1. MMSE>12
2. Meet criteria for probable DLB or probably PDD
3. If taking anticholinesterase drugs, memantine, antipsychotic medication and/or antiparkinsonian medication need to be stable on these agents for at least 1 month
4. Presence of reliable informant sufficient to provide information for informant rated scales
5. Evidence of persistent and recurrent visual hallucinations of a moderate to severe nature occurring in the month prior to inclusion in the study

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Sex
All

Key exclusion criteria
1. Skin allergies or sensitivities to electrode gels or any significant dermatological / scalp disease
2. Past history excess alcohol intake
3. History of moderate to severe visual impairment secondary to glaucoma, cataract, or macular degeneration
4. Metallic implants in the head/neck area or electronic implants of any kind (including pacemakers)

5. Past history of other neurological illness including, but not limited to stroke, intracerebral pathology and epilepsy
6. Psychotropic and other medications which may significantly interfere with cognitive testing and tDCS efficacy (including high dose antipsychotics, dopamine agoinsts, sedative antidepressants, benzodiazepines except when low dose and used as hypnotics or treatment for REM-sleep behaviour disorder and centrally acting anticholinergic drugs)

Date of first enrolment
18/11/2013

Date of final enrolment
01/02/2017

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Newcastle University
Newcastle upon Tyne
United Kingdom
NE4 5PL

Sponsor information

Organisation
Newcastle upon Tyne Hospitals NHS Foundation Trust (UK)

ROR
https://ror.org/05p40t847

Funder(s)

Funder type
Government

Funder Name
Newcastle NIHR Biomedical Research Unit in Lewy Body Dementia (UK); Grant Codes: BH120814

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	18/01/2019	21/01/2019	Yes	No
HRA research summary			28/06/2023	No	No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes