Structural and functional imaging of the frontoparietal cerebral cortex in the detection of mild cognitive impairment

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Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Other condition
Study type	Observational non invasive

Summary

ID

NL-OMON32688

Source
ToetsingOnline

Brief title
Frontoparietal activity in MCI

Condition

- Other condition

Synonym
Mild cognitive impairment, preclinical dementia

Health condition

Milde cognitieve stoornissen (geheugenpoli)

Research involving
Human

Sponsors and support

Primary sponsor: Universiteit Maastricht
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: diagnostic tools, functional neuroimaging, mental rotation, mild cognitive impairment

Outcome measures

Primary outcome

The main outcome measures are performance (mean reaction time and accuracy) and

the Blood Oxygen Level Dependent (BOLD) response during the functional tasks.

Firstly, the differences in BOLD response between groups will be calculated.

Secondly, the functional network underlying this performance will be analyzed

by using fractional anisotropy measures and granger causality mapping.

Secondary outcome

White matter lesions will be taken in consideration and resting state

connectivity will be analyzed

Study description

Background summary

Neuropsychological studies lack sufficient specificity and sensitivity in diagnosing preclinical Alzheimer disease. Some patients remain stable, others return to normal functioning and others develop Alzheimer disease. It has been suggested that diagnostic power might increase when combining cognitive test results with imaging markers. Functional imaging has already proven its relevance in cognitive neuroscience. Until now, many studies have investigated group differences experimentally in terms of different activity patterns in order to understand the pathology of diseases better. However, so far no study has investigated the capacity of combining neuropsychological test performance and the associated brain activation patterns for the diagnostic accuracy of

mild cognitive impairment. This study will investigate the diagnostic possibilities of functional imaging by using tasks in the scanner that are closely related to known clinical neuropsychological tests. Furthermore, we will also investigate the integrity of networks associated with these tasks. Many studies thus far have focussed on well defined areas, mostly the medial temporal lobe. However, recent research has shown that a network view is more valid. Since there is evidence for an anterior-posterior shift from normal to pathological ageing, we will investigate the frontal-parietal network. Tasks relying more on the parietal than the frontal lobe, will be used, because of the assumed shift of pathological processes toward posterior areas.

Study objective

In this study we aim to investigate two visuospatial tasks that demand activity in the prefrontal and parietal lobes and that are widely used in the clinical setting. We will investigate the diagnostic possibilities of combining clinical neuropsychological tasks and functional imaging and whether this can learn us more about the pathogenesis of Alzheimer*s disease.

Study design

Two groups, all male, matched on age and education level will be studied using a cross-sectional design. Participants will be invited twice, once for a neuropsychological assessment and a dummy scanner session. The second time, the functional imaging session will take place, using a mixed design and a blocked design for the cognitive tasks.

Study burden and risks

The expected risks and burden are expected to be minimal, since strict inclusion and exclusion criteria for the MRI are maintained. Participants will complete a screening questionnaire that checks for contraindications. When included, the burden and risks associated with this study are restricted to two visits on two separate days. The first day will start with the administration of several neuropsychological tests and questionnaires (30 minutes) and a training session in a dummy MRI scanner (30 minutes). On the second day, patients will be scanned in the MRI for one hour. MRI is a non-invasive method and the risks are negligible.

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 should have a least an impairment in the memory domain, with a CDR score 0.5, whereas participants in the control group should be cognitive healthy as determined by neuropsychological assessments. For both groups, the age range is between 58-68 years old. Only male patients will be included, who are right-handed or ambidexter and who have an average level of education. Participants have to fill in an informend consent and a screening questionnaire that contains questions about home adress, age, handedness, sensory functioning, profession, educational level, lifestyle, health and MRI-exclusion criteria

Exclusion criteria

Participants who do not fulfill the MRI-safety criteria are not allowed in the study
Furthermore, people with reduced vision, psychoactive medication use, substance abuse, past or present psychiatric or neurological disorders and structural abnormalities in the brain are not included in the study. Control participants with neuropsychological test results below average (based on normative data) will be excluded.

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Basic science

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	11-02-2009
Enrollment:	40
Type:	Actual

Ethics review

Approved WMO Date:	24-12-2008
Application type:	First submission
Review commission:	METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)

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	NL25297.068.08