Different types of motor learning in patients with early psychosis

Published: 21-09-2006
Last updated: 20-05-2024

The aim of this study is to examine three types of motor learning reflecting the function of different brain regions: brain stem, cerebellum and the basal ganglia. Besides the basal ganglia which are one region with a high presence of dopaminergic...

Ethical review	Approved WMO
Status	Recruiting
Health condition type	Schizophrenia and other psychotic disorders
Study type	Observational non invasive

Summary

ID

NL-OMON30184

Source
ToetsingOnline

Brief title
Motor learning in psychosis

Condition

- Schizophrenia and other psychotic disorders

Synonym
psychosis, schizophrenia

Research involving
Human

Sponsors and support

Primary sponsor: Erasmus MC, Universitair Medisch Centrum Rotterdam
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: basal ganglia, cerebellum, motor learning, Psychosis

Outcome measures

Primary outcome

1. To study whether motor learning as examined with three different types of motor learning (saccade adaptation, eye-blink conditioning, motor sequence learning) is changed in patients with schizophrenia

2. To study whether motor learning is differentially impaired in the three assigned motor learning tasks in patients with schizophrenia

Secondary outcome

1. To study whether there is an impact of pharmacological treatment on different motor learning tasks

2. To study whether there is an impact of actual psychopathology on different motor learning tasks

Study description

Background summary

Schizophrenia is the psychiatric disorder with the worst prognosis. Its lifetime prevalence is about 1% and the disorder starts at an early lifetime, often with a chronic course.
Although a lot of research has focused on the pathophysiology of schizophrenia, today it still remains unclear which neurobiological foundations cause the disorder. Focusing on the symptom level, it is well documented that besides the positive and negative symptoms neurological hard and soft signs are more prominent in patients with schizophrenia.
There is clear evidence from a broad field of research that patients suffering from schizophrenia demonstrate impairments in a lot of neuropsychological functions such as working memory, selected attention, verbal memory, explicit learning etc. Based on these impairments a number of theories about the

underlying pathophysiology have been developed, most of them stating that schizophrenia is a brain disorder affecting mostly the frontal and temporal regions of the brain. There is a lot of support for these theories from neuroimaging studies which find different brain activation patterns in patients with schizophrenia compared to healthy controls during task performance. Less attention has been given to motor learning, although the dopamine hypothesis strongly refers to the basal ganglia, a part of the motor system involved in motor skill acquisition. One recent theory, proposed by Andreasen states that the observed phenomenology of schizophrenia is based on disturbance of the cortico-cerebellar-thalamo-cortical circuit (CCTCC), resulting in a neurodevelopmentally derived *misconnection* syndrome. Very rapid on-line feedback between cortex and cerebellum via the thalamus is stated to be responsible for fluidly coordinating sequences of motor activity and thinking. This circuit is stated to be responsible for the synchronized coordination of sequences of motor activity and thinking. In patients suffering from schizophrenia this would cause a *cognitive dysmetria*.

Study objective

The aim of this study is to examine three types of motor learning reflecting the function of different brain regions: brain stem, cerebellum and the basal ganglia. Besides the basal ganglia which are one region with a high presence of dopaminergic neurons, all these regions are stated to be involved in the pathophysiology of schizophrenia as stated by the model of Andreasen.

Study design

The paradigm comprises three motor learning tasks:
1. Motor sequence learning: Subjects have to perform finger tapping sequence on a computer keyboard 12 times for 30 seconds each. Each trial is followed by a rest period of 30 seconds. Two hours later, subjects are asked to perform the finger tapping sequence again twice for 30 seconds separated by a rest period of 30 seconds. 24 hours later, this will be repeated again twice for 30 seconds. Outcome is the increase in performance measured in speed and accuracy
2. Eye-blink conditioning: Subjects will see a film on a computer screen. At the same time equipment to measure the eye-blink will be mounted on the head of subjects and a headphone will be put on. In a random order little air puffs will be delivered to the eye, which will be followed by a reflective eye-blink. In a certain percentage the air puff will be preceded by a tone delivered via the headphone. Outcome is how many trials have to be performed until subjects will make an eye- blink due to the tone before the air puff will be delivered.
3. Adaptation of saccadic eye movements: Subjects have to fixate a red dot on a computer screen which will be moved repeatedly. The reflective saccadic eye movements will be observed. After a short baseline measurement in which the saccade properties such as accuracy and latency are characterized, the saccade adaptation paradigm will start. The red dot that first jumped to the right 25

degrees, will be moved 5 degrees back to the left at the very moment of the reflective saccade. The consequence is that the subject perceives the first saccade as having been hypermetric. When this stimulus is repeated, subjects gradually and subconsciously decrease their initial saccadic eye movement. Outcome is how quickly the subject decreases the saccade amplitude.

Study burden and risks

Non invasive psychophysiological examination lasting about 3 hours (breaks included). In a separate session, for patients only, actual psychopathology and extrapyramidal symptoms will be assessed.

For these non-invasive psychophysiological examination procedures no risks are known.

Contacts

Public
Erasmus MC, Universitair Medisch Centrum Rotterdam

Dr Molewaterplein 40
3015 GD Rotterdam
Nederland
Scientific
Erasmus MC, Universitair Medisch Centrum Rotterdam

Dr Molewaterplein 40
3015 GD Rotterdam
Nederland

Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)

Elderly (65 years and older)

Inclusion criteria

all patients (treated or untreated) with a diagnosis of *first episode psychosis*, suggestive for the schizophrenia are eligible to participate in the study. Lifetime between 16 and 40 years

Exclusion criteria

Uncorrected visus disturbances, any neurological, cardiovascular, and respiratory diseases; pregnancy; other relevant psychiatric disorders. Subjects will also be excluded when they cannot understand the Dutch language sufficiently to understand the purposes and implications of the experiment.

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:	Recruiting
Start date (anticipated):	01-10-2006
Enrollment:	80
Type:	Actual

Ethics review

Approved WMO

Date:	21-09-2006
Application type:	First submission
Review commission:	METC Erasmus MC, Universitair Medisch Centrum Rotterdam (Rotterdam)

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	NL13283.078.06