Lateral inhibition and glaucoma: Solving the structure-function discrepancy.

Published: 02-08-2012
Last updated: 26-04-2024

The aim of this study is to compare levels of lateral inhibition between healthy subjects and glaucoma patients.

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Glaucoma and ocular hypertension
Study type	Observational non invasive

Summary

ID

NL-OMON37129

Source
ToetsingOnline

Brief title
Lateral inhibition and glaucoma.

Condition

- Glaucoma and ocular hypertension

Synonym
glaucoma, POAG

Research involving
Human

Sponsors and support

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

Intervention

Keyword: Glaucoma, Lateral inhibition, Structure-function

Outcome measures

Primary outcome

Test 1: Lateral inhibition can be studied in detail with a psycho-physical phenomenon called "illusion of movement." This phenomenon is based on the finding that a thin (dark) line between two (sinusoidal and reverse-phased) alternating in brightness straps on a fixed distance from the line appears to shift (Gregory and Heard The Quarterly J of Exp Psych 1983). With a variant of this experiment, lateral inhibition can be measured (Jansonius and Kuiper 1989). The depth of the lateral bands of the psychophysical line spread function is a measure of lateral inhibition.

Test 2. An alternative psycho-physical test to measure lateral inhibition is based on the Westheimer function (Westheimer G. J. Physiol. 1967). To distinguish a stimulus on a background of constant illumination is dependent on the diameter of the background. With a small diameter a reduced sensitivity is found because of spatial summation (the stimulus is less visible). When the diameter increases it fills the receptive field until lateral inhibition starts to work. The sensitivity will increase again to a balance where both spatial summation and lateral inhibition are 'saturated' . Endpoint is the difference in sensitivity between healthy subjects and glaucoma patients measured with a background in diameter where lateral inhibition is expected.

Test 3. The final way to measure lateral inhibition is based on contrast sensitivity measurements. Here, we measure a contrast sensitivity function and our outcome measure is the contrast sensitivity at low spatial frequencies

relative to the contrast sensitivity at medium spatial frequencies, which is a

measure of lateral inhibition.

Secondary outcome

N/A

Study description

Background summary

The hypothesis of the research described in this application is that lateral inhibition is lost a relatively early stage of glaucoma. This may explain the structure-function discrepancy that exists in glaucoma (the finding that a lot of ganglion cells may be lost before perimetry with a reduced response to measure). Because the stimulus used in perimetry used is large compared with the receptive field of the ganglioncel, loss of lateral inhibition may result in a greater response, that the smaller response by the loss of a part of the ganglion cells masks.

Study objective

The aim of this study is to compare levels of lateral inhibition between healthy subjects and glaucoma patients.

Study design

Case-control study

Study burden and risks

A single visit, in which several psychophysical tests are performed and a few extra tests to check the healthy state of the eye. Total time invested is 1.5 to 2 hours. In health subjects, it is possible that an eye disease is discovered during the course of this study. The resulting psychological stress to the subject can be a disadvantage. However, the advantage is an early start of adequate treatment. All measurements are conducted using optical techniques that do not touch the eye and therefore are completely harmless and so there is no risk during the experiments. No mydriasis (pupil dilation) will be implemented.

Contacts

Public
Universitair Medisch Centrum Groningen

Hanzeplein 1
Groningen 9700 RB
NL
Scientific
Universitair Medisch Centrum Groningen

Hanzeplein 1
Groningen 9700 RB
NL

Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

Glaucoma patients aged 18 years or older who visit the ophthalmology outpatient department of the UMCG, provide informed consent form and meet the inclusion-exclusion criteria.;Healthy subjects will consist of people who have signed in, without ophthalmic abnormalities and provide informed consent.

Exclusion criteria

Glaucoma patients:
- visual acuity below 0.8 (above 50 years) or below 1.0 (below 50 years of age)
- any other eye disease than glaucoma;Healthy subjects:
- visual acuity below 0.8 (above 50 years) or below 1.0 (below 50 years of age)

- any other eye disease

Study design

Design

Study type: Observational non invasive

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

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	02-08-2012
Enrollment:	60
Type:	Actual

Ethics review

Approved WMO

Date:	02-08-2012
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)

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	NL40563.042.12