Characterization of Bilateral Vestibulopathy II

Gepubliceerd: 01-06-2021 Laatst bijgewerkt: 15-05-2024

See above

Ethische beoordeling	Positief advies
Status	Werving gestart
Type aandoening	-
Onderzoekstype	Observationeel onderzoek, zonder invasieve metingen

Samenvatting

ID

NL-OMON21431

Bron
Nationaal Trial Register

Verkorte titel
N/A

Aandoening

Bilateral vestibulopathy

Ondersteuning

Primaire sponsor: Academisch Ziekenhuis Maastricht
Overige ondersteuning: Med-El

Onderzoeksproduct en/of interventie

Uitkomstmaten

Primaire uitkomstmaten

Summary:
1. A defined diagnostic approach for patients with bilateral vestibulopathy.
2. Defined strict inclusion criteria for vestibular implantation
3. A detailed insight into consumption of health care by patients with bilateral vestibulopathy

4. A detailed insight in the patient expectations of the vestibular implant

Full:
1. A defined diagnostic approach for patients with bilateral vestibulopathy:

A defined diagnostic approach will be the result of the investigations and questionnaires mentioned below.

a. Outcomes of disease related interview:
The results of the disease related interview will be presented for the whole group in tables:
- Number of patients with Meniere's, migraine, recurrent vestibulopathy, Meniere-like, sudden onset, etc.
- Number of patients with a positive family-history
- Number of patients with previous psychological/psychiatric help, including psychological/psychiatric diagnoses.

b. Outcomes of questionnaires:
The results of each questionnaire will be presented for the whole group.
- DHI:
This questionnaire distinguishes between mild, moderate and severe handicap as a result of dizziness. A table will present the number of patients with a mild, moderate and severe handicap.
- HADS:
This questionnaire screens for anxiety and depression. A table will show the number of patients in each category (score 0-8; 8-11; >11).
- Oscillopsia:
This questionnaire screens for the severity of experienced oscillopsia. A table will show the number of patients in each category (mild, moderate, severe).
- EQ-5D:
This questionnaire investigates quality of life regarding mobility, self-care, ADL, pain/disability, anxiety/depression. For the whole group, a weighed health-index will be calculated and reported in a table.
- HUI:
The Health Utilities Index (HUI) is a rating scale used to measure general health status and health-related quality of life (HRQoL). It measures a range of health domains including Vision, Hearing, Speech, Ambulation, Dexterity, Emotion, Cognition and Pain – each with 5 or 6 levels of ability/disability (which can be visualized in a table for the whole population).
- Fall risk questionnaire
This questionnaire investigates the risk of falling and severity of falls in the past month and year. A table will show the number of patients with a certain risk of falling.
- DizzyQuest (Psymate):
The Experience Sampling Method (ESM), an app-based diary is a feasible tool in symptom assessment in vestibular patients. It includes momentary assessment of symptoms, context, emotions, cognition and stressful events. A table will show the number of patients with certain symptoms at certain moments.

c. Physical examination:

If any abnormalities during physical examination, they will be presented for each case separately.
- Audiometric testing:
Audiometric results (no hearing loss, mild hearing loss, moderate hearing loss, severe hearing loss, total deafness, characteristics of the brainstem auditory evoked potentials) will be presented in a table with the number of patients for each category.
- Vestibular examinations:
Results of vestibular examinations (mild, moderate or severe bilateral vestibulopathy) will be presented in a table with the number of patients for each category.

2. Defined strict inclusion criteria for vestibular implantation
Inclusion criteria will be the result of the investigations mentioned above.

3. A detailed insight into consumption of health care by patients with bilateral vestibulopathy
- BV Cost Diary:
This questionnaire investigates loss of productivity regarding absence of work, loss of productivity without absence, loss of unpaid work, costs of hiring others for your unpaid work, hinder at work, global consumption of regular and non-regular health care, consumption of diagnostics and consumption of treatments. These parameters will be scored for each patient (days of absence, efficiency score, loss of time, costs of hiring others, “hinder score”, consumption of health care/diagnostics/treatments) and the group results will be calculated. Means, SD, median and ranges will be presented in a table
- ICECAP-A:
This questionnaire focuses on wellbeing in a broader sense. It is a measure of capability for the adult for use in economic evaluation. It comprises attachment, stability, achievement, enjoyment and autonomy.

4. A detailed insight in the patient expectations of the vestibular implant
We don’t know yet what patients really expect from the vestibular implant. Probably expectations can be categorized after conducting a detailed interview. The number of patients for each category will then be presented in a table. Furthermore, these categories will be described extensively.

Toelichting onderzoek

Achtergrond van het onderzoek

Bilateral vestibulopathy (BV) represents a major handicap with strong balance disturbances, higher risk of falls, visual symptoms (oscillopsia) and a loss of autonomy.
Prognosis is poor and treatment options are limited. At this moment, the department of ORL of Maastricht University Medical Center is working on a vestibular implant. Aim is to (partially) restore vestibular function.
However literature about the costs and burden of BV are scarce. Moreover, there is no consensus regarding vestibular testing procedures and the characteristics that define BV.

These are all important parameters for the implementation of the vestibular implant as a regular therapeutic device.

Objective:
1. Define diagnostic approach for patients with bilateral vestibulopathy.
2. Define inclusion criteria for vestibular implantation.
3. To gain a clear insight into consumption of health care by patients with bilateral vestibulopathy in Europe
4. Investigate patient expectations of the vestibular implant.

Study design: Observational Study

Study population: Sixty adult patients previously diagnosed with bilateral vestibulopathy at our vestibular department.

Intervention:
Patients will be invited for one day to our outpatient department for:
- Detailed physical, audiometric and vestibular examinations, as routinely performed at our department.
- A detailed interview about several topics: costs related to their disease, course of disease, co-morbidity and medication, previous psychological/psychiatric help and standardized questionnaires about quality of life, loss of productivity, anxiety and depression and vestibular complaints.

Main study parameters/endpoints:
1. A defined diagnostic approach for patients with bilateral vestibulopathy.
2. Defined strict inclusion criteria for vestibular implantation
3. A detailed insight into consumption of health care by patients with bilateral vestibulopathy
4. A detailed insight in the patient expectations of the vestibular implant

Nature and extent of the burden and risks associated with participation, benefit and group relatedness:
After returning written informed consent, selected patients will undergo:
- An extensive physical, audiometric and vestibular examination (about 3 hours), which are routinely performed at our ENT-department, to investigate patients with balance disorders. Due to the nature of their disease (bilateral vestibulopathy), these patients will not get sick by these tests, compared to persons with a still (partially) intact vestibular function.
- Some of the medications have to be stopped for the vestibular examination. The medications that have to be stopped are all the medicines against anxiety or depression (e.g. SSRI’s, benzodiazepines). Patients are only allowed to stop their medication after consulting their doctor. If they are not able to stop, they will be excluded from the study. Stopping these medications is a standard demand in our hospital for each patient that will undergo vestibular testing. Until now, we have not experienced any problems with patients who stopped their psychiatric medication for a short period of time. However, in case a patient is going to stop his/her psychiatric medication, gradual phasing out the medication for a time period of minimal two weeks, under supervision of the general practitioner is advised according to the NHG guidelines (Nederlands Huisartsen Genootschap).
- Detailed interview (about 1 hour). No burden is expected for the patients, except time. One

could hypothesize a psychological burden since patients will be interviewed about their past psychological/psychiatric history. However, this issue has already been addressed during their previous regular visits (when the diagnosis was made). Until now, no patients have refused or felt uncomfortable to inform us about their past medical history. If so, these patients will be excluded and not invited for the study.

All tests can be performed at one day. The major burden for the patient is time: one day is spent at our department in Maastricht.

Doel van het onderzoek

See above

Onderzoeksopzet

1 week - 1 day

Onderzoeksproduct en/of interventie

The investigations comprise:
1. Detailed Interview:
- Determine course of disease (differentiatie e.g. migraine, Meniere's, Meniere-like, Recurrent vestibulopathy, sudden onset, etc.)
- Determine co-morbidity and medication
- Determine family-history
- Determine patient expectations
- Determine previous psychological/psychiatric help

2. Questionnaire Loss of productivity: BV Cost Diary

3.Standardized questionnaires: DHI, HADS, Oscillopsia, EQ-5D, HUI, Fall risk questionnaire ICECAP-A.

4. An app-based diary for symptom assessment (DizzyQuest): The application can be downloaded on the devices of the patient and are ready for use after using a login code and password. The application will be used for 1 week, with 12 short questionnaires a day (morning and evening questionnaire and 10 questionnaires in between).

5. Physical examination:
- Ear, Nose & Throat inspection
- Neurological tests: oculomotor, coordination, sensibility

6. Audiometric testing:
- Audiometry: tone and speech. Audiometric bone conducting and air conducting thresholds will be determined.
- Brainstem auditory evoked potentials (BAEP) (auditory brainstem response, ABR): Auditory stimuli will consist of click stimuli at 40, 55 and 70 dB Sensation Level (SL), presented at a

rate of 11 clicks per second via calibrated earphones for 1,5 minute per DB SL (5 minutes in total). Responses will be measured with surface electrodes, which will include a ground electrode placed at the forehead, reference placed at the contralateral mastoid and a main signal placed at the ipsilateral mastoid. ABR waves I, II, III, IV, V will be assessed for their latency, amplitude, Inter Peak Latency and habituation. The mean response will be obtained by averaging across trials, and the mean response across participants within a same group will be computed to extract a grand average.

7. Vestibular examination:
- Electronystagmography:
o Oculomotor tests: Before the oculomotor tests are performed, nine electrodes will be placed on the forehead and around the eyes of the patient in order to measure eye movements. The patient then sits in complete darkness and is asked to follow moving dots and images on a screen in front of him/her. The examiner registers the eye movements on a computer.
o Torsion swing at 0.1Hz: The torsion swing test is performed using sinusoidal rotation (0.1Hz) with a peak velocity of 60°/s, while the subject sits in the chair in complete darkness. Eye movements are recorded with electronystagmography (with the nine electrodes already used with the oculomotor tests).
o Calorics: The caloric test is performed in a completely dark room, with eye movement calibration performed before each irrigation. Subjects are positioned in a supine position with their head tilted 30° from the horizontal plane. Each irrigation lasts 30 seconds with a volume of at least 250 ml water for cold (30°C) and warm (44°C) irrigations. A 5-minute stimulus interval is kept between irrigations. Eye movements are recorded with electronystagmography.
o c-Vemp, o-Vemp: Cervical Vestibular Evoked Myogenic Potentials are measured over the sternocleidomastoid muscle after stimulating the ipsilateral vestibular organ with air-conducted tone bursts of 500Hz, provided via inserted earphones at a stimulation rate of 13Hz. Subjects are in a supine position with their back tilted in an angle of 30° from the horizontal plane and are asked to turn their head away from the location of the stimulus and to lift their head up slightly. A visual feedback system connected with a monitor ensures correct muscle contraction. Two hundred electromyography (EMG) traces with a minimum mean rectified voltage (MRV) of 65 µV and a maximum MRV of 205 µV are accepted.
Ocular VEMPs are measured over the inferior oblique muscle after stimulating the contralateral vestibular organ with the same stimulation parameters as for cVEMPs. Subjects are in a supine position and are instructed to keep their eyes fixed on a focus point 30 degrees behind the head to achieve superomedial gaze. A minimum of 300 EMG traces are accepted.
Both VEMPs are recorded as auditory evoked potentials with electromyographic software and self-adhesive electrodes. VEMP thresholds are determined using a staircase approach with steps of 5 dB SPL. The threshold is defined after double conformation of the lowest sound level with an undetectable P1 and N1 peak.
- video-HIT: The horizontal vHIT and the vHIT in the Right-Anterior-Left-Posterior (RALP) and Left-Anterior-Right-Posterior (LARP) canal planes are performed using the Video-Head Impulse Test device. The subject sits on a static chair to prevent body movements during the test. The technician stands behind the subject and holds their head firmly without touching of the goggles. The subject maintains visual fixation on an earth-fixed target at a distance of 1.5

meters. Head impulses comprises fast (peak velocity >150°/s in horizontal plane, >100°/s in RALP and LARP plane), unpredictable, low-amplitude (±20°) head movements in the horizontal plane and in the RALP and LARP planes.
- Functional-HIT: The fHIT is performed using the fHIT system. Before the start of the fHIT, the static visual acuity threshold is acquired by the fHIT system in 20 trials. Optotype size starts from 1.0 LogMAR (log of the Minimum Angle of Resolution) and decreases depending on the subjects' rates of errors. Patients are seated in a static chair in front of a computer screen at a distance of 1.5 meter with a keyboard in their hand. During a passive head impulse, when head acceleration reaches its peak value, an optotype (Landolt C ring) is displayed on the screen for 80 ms. During fHIT, patients need to choose the right optotype out of eight different options by pressing the corresponding button on the keyboard. Head impulses comprises fast (peak velocity >150°/s), outwards, passive, horizontal rotational head movements with a low amplitude (±20°), unpredictable in timing and direction.
- Perception platform: A hydraulic platform is used to measure the perceptual self-motion thresholds within each subject. A twelve-option paradigm, six translations and six rotations, is delivered by the platform. The subject sits in complete darkness in a chair mounted on the platform, fastened by a seatbelt, while wearing a blindfold and headset to mask visual and auditive cues. The six translations includes motions in the horizontal plane (forward, backward, right, left) and in the vertical plane (up and down). The rotations includes yaw left, yaw right, pitch forward, pitch backward, roll left and roll right. Thresholds are found using a staircase protocol with a maximum duration of one hour. Motion trials starts at the highest possible acceleration and their directions are randomly chosen by the examiner. After each motion, the subject is asked to inform the examiner about the type and direction of the perceived movement. In case the subject can indicate the correct type and direction of the movement, the stimulus was decreased with 0.1m/s2 (translations) or 10deg/s2 (rotations). In case of an incorrect response, the acceleration is increased with 0.05m/s2 or 5deg/s2. If the subject then could indicate the correct type and direction of movement, the acceleration is decreased with 0.03m/s2 or 3deg/s2. However, in case of an incorrect answer, the acceleration is increased with 0.03m/s2 or 3deg/s2. A double confirmation of the lowest threshold combined with double incorrect responses at the acceleration one step below threshold, is considered the perceptual self-motion threshold for that motion profile.
- Dynamic Visual Acuity: the DVA is assessed on a treadmill with a computer screen placed at a distance of 2.8 meters from the subject. Sloan letter optotypes are used. Testing starts with optotypes presented at a LogMAR of 1.0. When four out of five optotypes are recognized correctly, the corresponding LogMAR is considered achieved and the size is decreased by steps of 0.1 LogMAR. When three or less optotypes are recognized correctly, the corresponding LogMAR is considered unachieved. The best (i.e., lowest) achieved LogMAR is recorded. Patients are tested in static condition (while standing still) and in dynamic conditions (while walking on the treadmill at 2, 4, and 6 km/h). Every condition is tested once. In case the patient is not able to walk independently at a certain speed, the test is stopped and registered as impossible for that speed.
- Motion Sensor: To measure the amount and pattern of daily physical activity, the patients will be wearing a small motion sensor for 1 week. The sensor will be attached to the thigh with a waterproof skin-friendly plaster (body attachment patch).
- Gait analysis: Participants will complete a number of walking trials on the CAREN system to assess their walking patterns, stability and biomechanics. The CAREN is a dual belt treadmill system with a 6 degree of freedom motion platform and a 180 degree virtual reality

environment. Reflective markers will be placed on anatomical landmarks and will be recorded via the system's 3D motion capture system. Additionally, two MOX accelerometers will be placed on the lower back and thigh to record lower limb and centre of mass accelerations during the tasks. At the beginning of the session, the system and set up will be explained to the participants, as well as the measurement protocol. The session will start with familiarisation trials, during which the participants will walk on the treadmill for short periods at multiple speeds to become accustomed to walking on the system. During all sessions, the subjects will be secured with a safety harness connected to an overhead frame. The CAREN operator will ensure that the subjects' knees cannot reach the ground and that the subject cannot walk too far to the front or back of the treadmill. The exact amount and characteristics of the familiarisation period is flexible due to the heterogenous nature of the patient group and their various experiences with treadmill walking. Once the CAREN operator, participant and clinical researcher are in agreement that the patient is comfortable and familiarised to the setup, the measurement protocol will begin. The protocol will include normal walking at 3 speeds, as well as walking with smaller and larger balance perturbations at the same three speeds. The perturbed gait condition features a pseudorandom mediolateral platform sway perturbation that runs continuously during the trial. The equation for the sway is based on a multisine function that has been adapted from previous studies in healthy participants so that the majority of participants should be able to cope with the first, whereas it is unknown how many patients will be able to cope with the second intensity. Based on our previous experience with patients with bilateral vestibulopathy at the CAREN, it is anticipated that about 50% will be able to complete the whole protocol, while the remainder will only complete part of the protocol. The familiarisation and rest periods are left flexible for this reason. For the patients who complete the protocol, if time, motivation and condition permit, a number of other protocols may be piloted. These would include the same three 3-minute trials over the three speeds with the addition of a head turning task, a cognitive dual task and/or while wearing a vibrotactile "balance belt". From all of these tasks, biomechanical measures of stepping behaviour, as well as gait stability and variability will be assessed, to investigate the influence of the various tasks on these parameters and more broadly how those might relate to the various measures of vestibular and balance function. In addition to the biomechanical gait assessment, a clinical balance evaluation test battery – the Mini Balance Evaluation System (BES) Test – will be performed to provide additional information of balance control in a number of daily life relevant tasks and lasts approximately 10-15 minutes.

Contactpersonen

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Deelname eisen

Belangrijkste voorwaarden om deel te mogen nemen (Inclusiecriteria)

In order to be eligible to participate in this study, a subject must meet all of the following criteria:
- Bilateral vestibulopathy, diagnosed at Maastricht University Medical Center according to the Bárány criteria:
• Horizontal angular VOR gain bilaterally <0.6
• And/or sum of the maximal peak velocities of the slow phase caloric induced nystagmus (stimulation with warm and cold water) bilaterally <6°/s
• And/or VOR gain <0.1 upon sinusoidal stimulation on torsion swing test (and/or a phase lead >68 degrees on torsion swing test)
- >18 years old
- Giving informed consent

Belangrijkste redenen om niet deel te kunnen nemen (Exclusiecriteria)

A potential subject who meets any of the following criteria will be excluded from participation in this study:
- Not being able (e.g. mentally disabled) or willing to talk about one of the investigated issues (e.g. psychology/psychiatry, health care utilization
- Not being able or willing to undergo one of the detailed physical, audiometric or vestibular examinations.
- Not being able to stop medication against anxiety or depression (after consulting their general practitioner)
- Not wanting to be informed about any incidental findings

Onderzoeksopzet

Opzet

Type:	Observationeel onderzoek, zonder invasieve metingen
Onderzoeksmodel:	Anders
Toewijzing:	N.v.t. / één studie arm
Blindering:	Open / niet geblindeerd
Controle:	N.v.t. / onbekend

Deelname

Nederland

Status:	Werving gestart
(Verwachte) startdatum:	01-06-2021
Aantal proefpersonen:	60
Type:	Verwachte startdatum

Voornemen beschikbaar stellen Individuele Patiënten Data (IPD)

Wordt de data na het onderzoek gedeeld: Nog niet bepaald

Ethische beoordeling

Positief advies

Datum:	01-06-2021
Soort:	Eerste indiening

Registraties

Opgevolgd door onderstaande (mogelijk meer actuele) registratie

ID: 49984
Bron: ToetsingOnline
Titel:

Andere (mogelijk minder actuele) registraties in dit register

Geen registraties gevonden.

In overige registers

Register	ID
NTR-new	NL9514
CCMO	NL72200.068.19
OMON	NL-OMON49984

Resultaten