

Do abnormalities in the control of brain blood flow account for dizziness on standing or after meals in older people?

Submission date 16/02/2012	Recruitment status No longer recruiting	☐ Prospectively registered ☐ Protocol
Registration date 19/03/2012	Overall study status Completed	☐ Statistical analysis plan ☐ Results
Last Edited 13/12/2017	Condition category Signs and Symptoms	☐ Individual participant data ☐ Record updated in last year

Plain English summary of protocol

Background and study aims

Orthostatic hypotension is where there is a large fall in blood pressure when a person stands from a lying position. Post-prandial hypotension is where a fall in blood pressure occurs within 2 hours of starting a meal. Both are common in older people. Previous studies have suggested that both these conditions can affect up to two thirds of those over 65 years of age. Both conditions can produce symptoms such as dizziness which can lead to health problems such as falls and hip fractures. Therefore these conditions have a tremendous impact on confidence and independence in older people. It has also been suggested by previous studies that death rates are higher. However, not all patients with a fall in blood pressure with standing or after meals have symptoms such as dizziness or light-headedness. On the other hand, some patients report symptoms suggestive of these conditions but do not have a significant fall in blood pressure. Cerebral autoregulation refers to how the body normally maintains a good blood flow within the circulation of the brain despite brief changes in blood pressure e.g. standing from a lying position. The stiffness or hardening of the arteries with age may also have an impact on cerebral autoregulation. There has been no investigation into why some patients who have orthostatic hypotension or post-prandial hypotension have symptoms and others do not. It may be that some people are less able to adapt to changes in blood pressure because of an underlying problem in cerebral autoregulation or increased hardening of arteries. Some patients have both conditions, but there has been little study into whether or not artery stiffness or maintenance of blood flow to the brain is the underlying problem in one or both conditions. The aim of this study is to investigate whether there is impairment in brain blood flow control (cerebral autoregulation) in orthostatic hypotension and post-prandial hypotension and whether this influences the presence or absence of symptoms.

Who can participate?

Anyone who can give informed consent and whom is over the age of 60 years of age can take part. They should not have atrial fibrillation (a condition where the heart beats very irregularly) or be on medication to slow the heart beat down as this can affect tests. This includes drugs such as atenolol and digoxin. Participants should be reasonably mobile as the study involves being tilted on a special bed.

What does the study involve?

Patients and volunteers (e.g. relatives) recruited to the study are divided into four groups for the orthostatic hypotension study and two groups for the post-prandial study based on whether they have a history suggestive of post-prandial hypotension.

The orthostatic hypotension study groups are as follows:

1. No orthostatic hypotension without symptoms
2. No orthostatic hypotension with symptoms
3. Orthostatic hypotension without symptoms
4. Orthostatic hypotension with symptoms

The post-prandial hypotension study groups are as follows:

1. No postprandial hypotension
2. Post-prandial hypotension

On the day of the test participants have their height and weight measured, followed by a basic clinical examination of the heart, lungs and the nervous system. Basic tests of heart rate and blood pressure response to standing, deep breathing, valsalva (blowing into a syringe) and handgrip are undertaken. Arterial stiffness is estimated using the time it takes for a pulse to travel the distance between the carotid artery in the neck and the femoral artery at the top of the leg. Changes in blood flow in the brain are measured using an ultrasound probe over the surface of the skull (transcranial Doppler) in a lying position and nearly standing position (i.e. a tilted position using a special bed). This is for a maximum of 30 minutes for the orthostatic hypotension study and 60 minutes for the post-prandial hypotension study. Those who feel light-headed are returned to a lying position immediately. Capillary blood sugar is checked by gently pricking the finger with a needle. This is only done once for the orthostatic hypotension study, but is done three times on each of the two days for the post-prandial study. For those taking part in the post-prandial study, participants are randomly allocated to drink Lucozade (containing glucose) or a sparkling water and sugar-free orange squash on two separate dates, whilst monitoring brain blood flow, blood pressure and heart rate changes. Observation between these groups for these parameters are looked at in the lying and nearly standing positions (tilted position) and analysed.

What are the possible benefits and risks of participating?

This study will provide information as to whether there is poor adaptation in the blood circulation in patients with orthostatic hypotension and post-prandial hypotension. The measurements will be compared to people with no orthostatic hypotension with or without symptoms. This will allow the targeting of treatments for this condition to improve quality of life for older people and reduce associated complications including falls and fractures. The main risk of taking part is provocation of symptoms if participants have a history of this. There is slight discomfort when a finger-prick blood sample is taken.

Where is the study run from?

The study is being carried out at the Norfolk & Norwich University Hospital site, but as part of the University of East Anglia (UK)

When is the study starting and how long is it expected to run for?

Recruitment for the study began in February 2011 and shall continue until March 2013.

Who is funding the study?

Dunhill Medical Trust (UK)

Who is the main contact?

Dr Alice Ong

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Contact information

Type(s)

Scientific

Contact name

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Additional identifiers

Protocol serial number

9951

Study information

Scientific Title

Do abnormalities in dynamic cerebral autoregulation underlie the pathophysiology of the common causes of syncope in older people?

Study objectives

Part 1 - To investigate if differences in dynamic cerebral autoregulation are related to the symptoms of orthostatic hypotension in patients with and without a postural blood pressure (BP) fall

Part 2 - To investigate if:

2.1. Cerebral autoregulation is impaired in patients with post-prandial hypotension, and

2.2. If it is impaired to investigate if this relates to symptoms

The primary methodology will be using transcranial doppler ultrasound and other parameters to calculate the autoregulatory index. For Part 1 (Orthostatic hypotension) 80 participants will be observed during head up tilt whilst undergoing transcranial doppler ultrasound. For Part 2 (Post-prandial hypotension) 40 participants shall undergo head up tilt and also receive an oral beverage (glucose and placebo on separate attendances) in a randomised double-blind cross-over fashion.

Ethics approval required

Old ethics approval format

Ethics approval(s)

Norfolk Research Ethics Committee, 30/09/2010, ref: 10/H0310/46

Study design

Interventional double-blind randomised controlled and observational study

Primary study design

Interventional

Study type(s)

Diagnostic

Health condition(s) or problem(s) studied

Syncope

Interventions

Participants shall have height, weight, medical history taken with a basic examination of the cardiovascular, respiratory and neurological system. Orthostatic grading score shall be obtained by answering a questionnaire. Autonomic function tests, Pulse Wave Velocity and Augmentation Index shall be measured at baseline.

Changes in cerebral blood flow velocities shall be measured using an transcranial Doppler ultrasound in a supine position and then with a 70 degree tilt. This will be for a maximum of 30 minutes for the orthostatic hypotension study and 60 minutes for the post-prandial hypotension study. Those who develop symptoms will be returned to a lying position immediately. Cerebral blood velocity, blood pressure and heart rate shall be simultaneously recorded.

A baseline capillary blood glucose shall be taken. Once for the orthostatic hypotension study, and at baseline, 30minutes and 60 minutes for the post-prandial study.

For those taking part in the post-prandial study, participants will be randomly allocated to drink Lucozade (containing glucose) or a sparkling water and sugar free orange squash on two separate dates within a 2 week period .

Intervention Type

Other

Phase

Not Applicable

Primary outcome(s)

Autoregulatory index for baseline, at 1 and 3 minute of tilt and the last 3 and 1 minute of tilt, the duration of which is dependent on the presence or absence of symptoms

Key secondary outcome(s))

1. Arterial stiffness
2. Baroreceptor sensitivity

Completion date

30/09/2013

Eligibility

Key inclusion criteria

Age $\geq$ 60 years, male or female

Participant type(s)

Healthy volunteer

Healthy volunteers allowed

No

Age group

Senior

Sex

All

Key exclusion criteria

1. Known autonomic neuropathy
2. Irregular heart rhythm such as atrial fibrillation
3. On drugs known to affect autonomic function
4. Uncontrolled high blood pressure
5. Stroke
6. Known carotid artery stenosis
7. Severe cognitive impairment
8. Severe physical impairment

Date of first enrolment

15/02/2011

Date of final enrolment

01/03/2013

Locations

Countries of recruitment

United Kingdom

England

Study participating centre

Norfolk and Norwich University Hospitals NHS Foundation Trust

Norwich

United Kingdom

NR4 7UY

Sponsor information

Organisation

University of East Anglia (UK)

ROR

<https://ror.org/026k5mg93>

Funder(s)

Funder type

Government

Funder Name

Dunhill Medical Trust (UK)

Alternative Name(s)

The Dunhill Medical Trust, Dunhill Medical Trust, DunhillMedical, DMT

Funding Body Type

Private sector organisation

Funding Body Subtype

Trusts, charities, foundations (both public and private)

Location

United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary