# Thiamine supplementation in type 2 diabetes

Submission date 20/11/2009	<b>Recruitment status</b> No longer recruiting	[X] Prospectively registered [_] Protocol
<b>Registration date</b> 04/01/2010	<b>Overall study status</b> Completed	<ul> <li>Statistical analysis plan</li> <li>Results</li> </ul>
Last Edited 20/04/2017	<b>Condition category</b> Nutritional, Metabolic, Endocrine	<ul> <li>Individual participant data</li> <li>Record updated in last year</li> </ul>

### Plain English summary of protocol

#### Background and study aims

People with diabetes mellitus are at increased risk of developing heart disease and strokes. Thiamine is a vitamin that is needed by the body to regulate blood sugar levels and may also be involved in preventing heart disease. This study aims to see whether giving additional thiamine can reduce the risk of developing heart disease.

#### Who can participate?

This study is looking for 34 participants aged between 18 and 70 who are known to have type 2 diabetes.

### What does the study involve?

This study will take place over a 5-month period and participants will need to attend for four visits each lasting about 2 hours. On the first visit you will need to undergo a routine physical examination and have an ECG (tracing of your heart). At each of the visits you will need to have fasted from the evening before, provide a sample of urine (to test for protein levels) and undergo blood tests (30 ml of blood) to check your kidneys, liver, blood fat levels, insulin sensitivity, thiamine levels, and diabetes control. We will then assess the function of the lining of the blood vessels using a probe that is applied to your fingertip (this is painless) attached to a specialised machine. We repeat the finger-probe test after administration of GTN spray under the tongue and again following administration of inhaled salbutamol via a spacer device. These medications are usually used for angina and asthma respectively and work by temporarily dilating the blood vessels. At the doses used in the study they have rare mild side effects which include transient headache and a metallic taste in the mouth. After the first visit you will be given either thiamine tablets to be taken once a day or a placebo (dummy) equivalent. You are to take these tablets for 8 weeks and then return for the same protocol of urine, blood and fingerprobe testing as described above. You will then be given a minimum 2-week break before the same testing procedure will be repeated with a further 8-week administration of thiamine or placebo (whichever you did not receive the first time). The blood samples taken during the study will be stored for up to 12 months after completion of the study and may be analysed for other markers that may be related to circulatory disease.

What are the possible benefits and risks of participating?

The aim is to see whether thiamine can help reduce the risk of developing diseases such as heart attacks and stroke while also improving a persons general diabetic health. Therefore, although

the study will not specifically benefit your diabetic/medical care, the results may be beneficial in the care of many patients with diabetes in the future. The Food Standards Agency has shown that the oral administration of thiamine is safe and non-toxic. A small number of individuals may show an allergic response to lower doses but reports of these events are rare.

Where is the study run from?

The study will be run from Queen Alexandra Hospital, Portsmouth Hospitals NHS Trust (UK).

When is the study starting and how long is it expected to run for? The study ran from February 2010 to August 2011.

Who is funding the study? All study funding is coming from internal departmental budgets.

Who is the main contact? Dr Georgina Page gljpage@gmail.com

### **Contact information**

**Type(s)** Scientific

**Contact name** Prof Michael Cummings

### **Contact details**

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## Additional identifiers

EudraCT/CTIS number

**IRAS number** 

ClinicalTrials.gov number

Secondary identifying numbers PHT/2009/36

## Study information

### Scientific Title

Oral thiamine (Vitamin B1) supplementation in subjects with type 2 diabetes mellitus: a randomised, double-blind, placebo-controlled crossover trial assessing biophysical markers of endothelial function, oxidant stress, insulin sensitivity and vascular inflammation

### **Study objectives**

It is well known that people with type 2 diabetes are more prone to circulatory-related diseases (heart attack, stroke) when compared with individuals without diabetes. It is thought that this is related to problems with the function of the lining of blood vessels (endothelium), an increase in generalised inflammation within the blood vessels and various other factors including overproduction of harmful by-products (oxidative stress). The changes in the endothelium that occur subsequently contribute to blocking of the arteries (atherosclerosis), which can lead to heart attack or stroke.

Similar mechanisms to those just described have been implicated in the development of other complications of type 2 diabetes such as kidney and eye disease as well as the development of type 2 diabetes itself. Traditional risk factors for this include smoking, raised cholesterol, excess weight and family history and these have all been extensively studied. However, despite modification of these risk factors the occurrence of these diabetes and these complications continues to rise and therefore further research is being done to look at other potential modifiable elements.

Thiamine is a water-soluble vitamin essential found naturally in raw foods. It is known that, despite a normal dietary intake of thiamine, people with diabetes have a lower level of thiamine in their blood compared to individuals without diabetes. It is an important regulator of glucose metabolism and some experimental studies have shown that thiamine may have a role in maintaining function of the endothelium.

This study aims to investigate whether thiamine supplementation will have benefits in the way of reducing inflammation, reducing formation of harmful by-products and improving the bodys ability to use insulin.

Ethics approval required

Old ethics approval format

**Ethics approval(s)** Southampton B Research Ethics Committee (REC), 11/01/2010, ref: 09/H0504/137

**Study design** Single-centre randomised placebo-controlled double-blind crossover trial

**Primary study design** Interventional

**Secondary study design** Randomised controlled trial

**Study setting(s)** Hospital

Study type(s)

### Treatment

### Participant information sheet

Not available in web format, please use the contact details below to request a patient information sheet

### Health condition(s) or problem(s) studied

Type 2 diabetes mellitus

### Interventions

Thiamine (vitamin B1/thiamine hydrochloride) versus placebo. Thiamine is being given orally at a dose of 300 mg daily for 8 weeks.

Total duration of treatment: 8 weeks each for thiamine or placebo Duration of follow-up: 18 weeks in which the participant is in the study

Intervention Type

Drug

**Phase** Phase II

### Drug/device/biological/vaccine name(s)

Thiamine

### Primary outcome measure

Change in VCAM-1 (vascular adhesion molecule-1) levels pre- and post-treatment (baseline and 8 weeks). This is a surrogate marker of vascular inflammation.

### Secondary outcome measures

Measured at 8 weeks:

1. Measurement of endothelial dysfunction determined by the reflection index of the digital volume waveform using photoplethysmography

2. Measurement of insulin sensitivity (pancreatic B-cell function [HOMA-B] method)

3. Markers of oxidant stress (total antioxidant status [TAOS], lipid hydroperoxides [LHP], cyclic guanosine monophosphate [cGMP], glutathione [GSH]/oxidised glutathione [GSSG])

4. Markers of vascular inflammation (high sensitivity C-reactive protein [hsCRP] and albumin /creatinine ratio [ACR])

5. Glycaemic control (HbA1c, fructosamine)

6. Lipid parameters

Overall study start date

01/02/2010

Completion date 02/08/2011

# Eligibility

Key inclusion criteria

 Individuals with a diagnosis of type 2 diabetes mellitus with a more than 30% chance of cardiovascular disease (ischaemic heart disease, cerebrovascular disease or peripheral vascular disease) over the next 10 years
 HbA1c less than 10%
 Between the ages of 18 and 75 years, either sex

#### Participant type(s)

Patient

#### Age group

Adult

### Lower age limit

18 Years

Sex

Both

### Target number of participants

34

### Key exclusion criteria

1. Established cardiovascular disease (ischaemic heart disease, cerebrovascular disease or peripheral vascular disease)

- 2. Allergy/intolerance to thiamine supplementation
- 3. Insulin treatment
- 4. Diuretic treatment
- 5. Current multivitamin/thiamine therapy
- 6. Abnormal thyroid function

7. Chronic excess alcohol consumption/impaired liver function (greater than 21 units per week in females, greater than 28 units per week in males; Department of Health Guidelines)

### Date of first enrolment

01/02/2010

Date of final enrolment 02/08/2011

### Locations

**Countries of recruitment** England

United Kingdom

Study participating centre

Academic Department of Diabetes and Endocrinology

Portsmouth United Kingdom PO6 3LY

### Sponsor information

**Organisation** Portsmouth Hospitals NHS Trust (UK)

Sponsor details Southwick Hill Road Cosham Portsmouth England United Kingdom PO6 3LY

martine.cross@porthosp.nhs.uk

**Sponsor type** Hospital/treatment centre

Website http://www.porthosp.nhs.uk/

ROR https://ror.org/009fk3b63

### Funder(s)

**Funder type** Government

**Funder Name** Portsmouth Hospitals NHS Trust (UK) - Academic Department of Diabetes and Endocrinology

**Funder Name** Diabetes UK (UK) - in process of applying for a small grant

## **Results and Publications**

### Publication and dissemination plan

Not provided at time of registration

Intention to publish date

### Individual participant data (IPD) sharing plan

### **IPD sharing plan summary** Not provided at time of registration

### Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
HRA research summary			28/06/2023	No	No