Effects of caloric restriction and weight loss on hypothalamic function in response to glucose ingestion in patients with type 2 diabetes mellitus.

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1) To determine the effects of caloric restriction on hypothalamic function in response to glucose ingestion in patients with type 2 diabetes mellitus.2) To determine the effects of weight loss on hypothalamic function in response to glucose...

Ethical review	Approved WMO
Status	Pending
Health condition type	Glucose metabolism disorders (incl diabetes mellitus)
Study type	Interventional

Summary

ID

NL-OMON30633

Source
ToetsingOnline

Brief title
Effects of caloric restriction on hypothalamic function in DM2

Condition

- Glucose metabolism disorders (incl diabetes mellitus)
- Glucose metabolism disorders (incl diabetes mellitus)

Synonym
diabetes, diabetes mellitus type 2

Research involving
Human

Sponsors and support

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

Intervention

Keyword: diabetes, fMRI, hypothalamus, weightloss

Outcome measures

Primary outcome

Changes in reaction pattern of neuronal activity (as measured with fMRI) in the

hypothalamus in respons to intake of glucose in patients with diabetes type 2,

before caloric restriction and after 3 days and 6 weeks low calorie diet (i.e.

before and after weight loss).

Secondary outcome

n.a.

Study description

Background summary

The hypothalamus plays a central role in the regulation of energy intake, feeding behaviour and lipid and glucose metabolism. Previous functional magnetic resonance imaging (fMRI) provided in vivo evidence for distinct hypothalamic function in lean and obese humans. In obese subjects, the fMRI signal in areas corresponding to the paraventricular and ventromedial nuclei in response to glucose ingestion was attenuated and delayed. A recent study showed that the hypothalamic response to glucose ingestion in patients with type 2 diabetes mellitus (DM2) is almost absent as compared to healthy individuals. This may have important physiological sequelae, as the hypothalamus is intimately involved in the control of glucose and lipid metabolism. Caloric restriction and weight loss profoundly affect metabolic control in obese humans with or without DM2.
To investigate whether caloric restriction and/or weight loss restore the hypothalamic response to ingestion of glucose in patients with DM2, fMRI of hypothalamic activity will be performed during ingestion of glucose solution in

patients with DM2 at three different time point during caloric restriction.

Study objective

1) To determine the effects of caloric restriction on hypothalamic function in response to glucose ingestion in patients with type 2 diabetes mellitus.

2) To determine the effects of weight loss on hypothalamic function in response to glucose ingestion in patients with type 2 diabetes mellitus.

Study design

Experimental, longitudinal study, with within-individual comparison

Intervention

Participants are on a low calorie diet for 6 weeks. During this period they will undergo a fMRI examination that also comprises drinking of 300 ml glucose solution.

Study burden and risks

Before inclusion, subjects will undergo a general medical exam, comprising measurement of body length and weight, hip and waist circumference and body composition by means of Bioelectrical Impedance Analysis (BIA). Also, 13 ml of blood will be drawn for assessment of basement parameters

Subjects will visit the hospital on three occasions. Each visit takes two hours and consists of a functional MRI examination of one hour and measurement of body length and weight, hip and waist circumference and body composition (BIA). During fMRI, subjects drink 300 ml of glucose solution, immediately before and after fMRI 2 ml blood will be drawn.
Time will also be spent on evaluation of the diet program and coaching.

Participants treated with oral antidiabetic drugs are asked to stop this medication 2 days prior to the baseline scan. All participants will be asked to check fasting blood glucose daily and contact the supervising physician in case the fasting blood glucose exceeds a value of 10 mmol/L. Participants will be contacted on day 5, 10 and 21 of the diet for evaluation of fasting blood glucose levels and for coaching. When fasting blood glucose remains below threshold for more then 10 days, a specialist will be consulted to diminish test frequency to once every two days.

Participants are on a low calorie diet for six weeks. Especially during the first days, this may invoke lightheadeness or a general feeling of weekness.

Both the general medical examination at screening and the MRI images may yield unexpected findings.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

Male,
Body Mass Index (BMI) higher than 25 kg/m2 with a maximum of 30 kg/m2,
age 40-60 years,
Diabetes type 2

Exclusion criteria

Impaired renal function (serum creatinine > 176 µmol/L).
Use of SU derivatives or insuline
Leg ulcers, gangrene.
Blood pressure > 160/100 mmHg with or without antihypertensive drugs.
Contra indications MRI: p.e. pacemaker, aneurism clips, metallic implants, neurostimulator, metal foreign bodies, hydrocephalus pump, claustrophobia

Study design

Design

Study type: Interventional

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

Recruitment

NL

Recruitment status:	Pending
Start date (anticipated):	17-03-2007
Enrollment:	12
Type:	Anticipated

Ethics review

Approved WMO

Application type:	First submission
Review commission:	METC Leids Universitair Medisch Centrum (Leiden)

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	NL16369.058.07