Effects of acute elevation of plasma free fatty acids on cardiac lipid accumulation in healthy lean young men

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The major research objective is:- to examine whether elevation of plasma FFAs results in cardiac lipid accumulation and whether this influences cardiac function negatively.Additional research objective: - to examine whether cardiac lipid content is...

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Heart failures
Study type	Interventional

Summary

ID

NL-OMON32915

Source
ToetsingOnline

Brief title
Free fatty acids and cardiac lipids

Condition

- Heart failures
- Diabetic complications

Synonym
cardiac steatosis, heart failure

Research involving
Human

Sponsors and support

Primary sponsor: Universiteit Maastricht
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: cardiac lipid content, diastolic function, plasma free fatty acids, systolic function

Outcome measures

Primary outcome

Cardiac lipid content after the high FFA condition compared to the low FFA

condition and the cardiac function and energy status associated with it.

Secondary outcome

Cardiac lipid content before exercise compared to after exercise.

Study description

Background summary

There is increasing evidence that Cardiac lipid content (IntraCardiomyoCellular Lipid, ICCL), is involved in the etiology of dilated cardiomyopathy and heart failure4,5. We hypothesize that the heart is passively taking up FFAs when the availability is high, thereby leading to an increased storage. To test this hypothesis, we want to manipulate FFA levels and monitor cardiac lipid content and cardiac function and energy status.
Recently, proton magnetic resonance spectroscopy has been adapted to enable quantification of lipid content in cardiac muscle16,17.

Study objective

The major research objective is:
- to examine whether elevation of plasma FFAs results in cardiac lipid accumulation and whether this influences cardiac function negatively.
Additional research objective:
- to examine whether cardiac lipid content is decreased after cycling (as it is the case in skeletal muscle).

Study design

Cardiac lipid content and cardiac function will be determined in a condition with high plasma FFA (cycling and recovery in fasted state) and in a low FFA condition (cycling and recovery with glucose supplementation). Remaining fasted during cycling and recovery has been shown to result in strongly increased FFA

levels, while glucose supplementation completely blunts the increase in FFA.

Intervention

Subjects will perform a two-hour cycling test, once fasted (high FFA condition) and once with glucose supplementation (low FFA condition). Before and after the cycling test and again after a three-hour recovery period, cardiac lipid, cardiac function and energy status will be performed by MRI/MRS.

Study burden and risks

First visit: determination of maximal aerobic capacity and body composition (ca 1.5 hours). Second and third visit (test days, ca. 8h): After a baseline MRI/MRS-scan, subjects will cycle for two hours, immediately after cycling another MRI/MRS-scan will be performed and after two more hours of recovery another MRI/MRS-scan will be perfored. During cycling and recovery period, indirect calorimetry will be performed and blood will be sampled repeatedly (10 ml) from a cathetherplaced in the anticubital vein. On one visit, subjects will get a glucose drink, on the other occasion only water. The experimental procedures are without risks, except for insertion of a cathether for blood sampling, which can occasionally cause a local haematoma or bruise to occur. MRS is a safe procedure (no ionizing radiation), with no known health risk as long as none of the exclusion criteria is met.

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

age (18-35)
BMI (18-25)
sex (male)

Exclusion criteria

Contraindications for MRI (e.g. electronic implants such as pace-makers or neurostimulators, iron particles in eyes and claustrophobia)

Study design

Design

Study type:	Interventional
Intervention model:	Crossover
Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Basic science

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	01-12-2008
Enrollment:	20

Type:	Actual

Ethics review

Approved WMO Date:	19-11-2008
Application type:	First submission
Review commission:	METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)

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	NL24637.068.08