Helium induced organ protection and the role of circulatory factors: secretion of Caveolin to the bloodstream (HeCav) in humans.

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Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Cardiac disorders, signs and symptoms NEC
Study type	Observational invasive

Summary

ID

NL-OMON40987

Source
ToetsingOnline

Brief title
HeCav

Condition

- Cardiac disorders, signs and symptoms NEC

Synonym
cardioprotection, organprotection

Research involving
Human

Sponsors and support

Primary sponsor: Academisch Medisch Centrum

Source(s) of monetary or material Support: Ministerie van OC&W,Society of cardiovascular anesthesiology (SCA)

Intervention

Keyword: cardiovasculair, Helium, organ protection

Outcome measures

Primary outcome

The main endpoints of this study are measuring cell damage by way of LDH measurements and apoptosis (eg caspase 3/8/9 activity, tunnel staining) in Human Umbilical Vein Endothelial Cells, Human Coronary Artery Endothelial Cells and rat cardiomyocytes against hypoxic induced damage by serum taken from the volunteers. Furthermore, the expression levels of Caveolin 1 and 3 in serum of the volunteers will be determined.

Secondary outcome

not applicable

Study description

Background summary

Based on experimental and clinical data that show a profound organ protective effect of the noble gas helium we here aim to investigate the underlying mechanism of this effect using a translational approach. We hypothesize that serum taken from volunteers subjected to 30 minutes of helium inhalation can protect different cell types in vitro. Based on results showing that Caveolins are secreted into the blood stream of different animal species after helium inhalation we aim to investigate the role of these circulating factors in mediating the protective effect of helium in humans.

Study objective

The primary objective of this study is to investigate whether serum taken from volunteers subjected to 30 minutes of helium inhalation can protect different

cell types against hypoxia-reperfusion induced damage and to investigate the role of circulating Caveolins in mediating this protective effect.

Study design

Single center, explorative study with a cross-over design, using the principle of balanced assignment.

Study burden and risks

All volunteers have to undergo two experimental *cycles*: one with heliox inhalation (79% helium, 21% oxygen) and one with inhalation of normal room air. Until now, no relevant cardiovascular, pulmonary, allergic or other side effects of helium inhalation have been reported. A gas mixture of helium and oxygen (heliox) is already used for clinical purposes, such as patients with severe asthma or for children undergoing mechanical ventilation. Volunteers will experience a transiently higher voice after helium inhalation Between the experimental cycles there will be an episode of at least one week. One cycle includes one whole day in the AMC (± 7 hours total stay) with blood withdrawal at 3 different time points, and another blood withdrawal on the next day in the morning (±24 h after inhalation), in total 4 times blood withdrawal for each experimental cycle. On the day of participation, a physical examination (cardiopulmonary system) will be performed by a physician. Twelve hours before the start of the experimental cycle, the volunteer is not allowed to drink coffee or other caffeine containing drinks, alcohol containing drinks or to smoke. Doing any kind of sports on the night before the experimental day in the AMC, or the night before the second day is also prohibited.
On the experimental day, the volunteers have to stay in the research room in which circumstances will be as standardized as possible. Until after the helium inhalation the volunteers have to stay seated in a chair and they will be offered time to read or to watch video. After that, they will receive a lunch that will be the same for every volunteer and the volunteers are allowed to walk around but they have to stay within the AMC.
Each blood withdrawal will be taken by a separate venous puncture performed by a physician with extensive experience in this field, such as an anesthesiologist. For this study, the blood sampling cannot take place through a venous access line. In former studies the venous access line often caused problems during blood sampling which troubled measurements of parameters afterwards. The volunteer gives approximately 29 ml blood per time point, after centrifugation (to separate cells from the serum) approximately 15 ml blood serum will be left to incubate the different cell types and to investigate the expression levels of Caveolin in the serum and for laboratory test (Leucocyte count, Hb, CRP). 116 ml for one experimental cycle (2 days) and a total of 232 ml for the whole experiment (4 days), spread over one to two weeks.

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

Non-smoking, healthy, male volunteers aged 20-55 years.

Exclusion criteria

1. Active smoking or smoking in the 6 months previous to the investigation;
2. Alcohol abuse or use of recreational drugs
3. Any allergic reaction on medication in the past
4. Presence of a chronic disease that is under current medical observation and needs pharmacological treatment, e.g. asthma, high

blood pressure or diabetes

Study design

Design

Study type:	Observational invasive
Intervention model:	Crossover
Allocation:	Randomized controlled trial
Masking:	Single blinded (masking used)
Control:	Placebo
Primary purpose:	Treatment

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	16-06-2014
Enrollment:	20
Type:	Actual

Medical products/devices used

Product type:	Medicine
Brand name:	heliox21
Generic name:	helium (79% plus 21% oxygen)
Registration:	Yes - NL outside intended use

Ethics review

Approved WMO Date:	05-03-2014
Application type:	First submission
Review commission:	METC Amsterdam UMC
Approved WMO Date:	19-03-2014

Application type:	First submission
Review commission:	METC Amsterdam UMC

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
EudraCT	EUCTR2014-000220-23-NL
CCMO	NL48054.018.14