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Mechanisms of remote ischemic preconditioning in humans

Submission date
06/05/2014

Recruitment status
No longer recruiting

Registration date
22/05/2014

Overall study status
Completed

Last Edited
17/01/2019

Condition category
Circulatory System

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
Cardiovascular events such as heart attacks and strokes are the main cause of illness and death in western countries. Remote ischemic preconditioning (RIPC) is a feasible and practical method to protect the heart against damage after surgery. It is produced by repeated short periods of oxygen interruption using a blood pressure cuff at the upper arm. Serum is the part of blood that is like water and that contains substances (called antibodies) that fight disease. The aim of this study is to find out whether serum taken from male volunteers that underwent this procedure can protect certain cells from a artificially induced absence of oxygen.

Who can participate?
Healthy male volunteers, age 18-45 years.

What does the study involve?
For the remote ischaemic conditioning stimulus, a pressure cuff will be placed on the upper arm and inflated for 5 minutes. Pressure will be released during 5 minutes, after which the cycle will be repeated three more times for a total of four cycles. Blood samples will be taken at three different time points and the blood will be used in the laboratory for further investigations.

What are the possible benefits and risks of participating?
There are no direct benefits or risks for the volunteer. Remote ischaemic conditioning is in itself a safe intervention. Volunteers can experience slight discomfort during inflation of the tourniquet around their upper arm. Blood withdrawal can also give a slight discomfort but is without risk for the volunteer.

Where is the study run from?
Academic Medical Centre (AMC) (Netherlands).

When is the study starting and how long is it expected to run for?
The study ran from June to August 2012.

Who is funding the study?
Academic Medical Centre (AMC) (Netherlands).

Who is the main contact?
Prof Benedikt Preckel

Contact information

Type(s)
Scientific

Contact name
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Additional identifiers

Protocol serial number
NL38188.018.11

Study information

Scientific Title
Mechanisms of Remote Ischemic PreConditioning in humans: prevention of cellular damage by serum collected after remote conditioning of the upper arm of human male volunteers

Acronym
Me-RIPC

Study objectives
We hypothesize that serum taken from volunteers subjected to remote ischemic conditioning of the upper arm can protect different human umbilical vein endothelial cells from hypoxia-reperfusion induced damage. If we find protection we aim to investigate the underlying mechanism of this protection in the in vitro model.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Medical Ethics Committee of the Academic Medical Center in Amsterdam, 12/01/2012, METC Number: 2012_014, ABR Number: NL38188.018.11

Study design
Researcher blinded study

Primary study design
Interventional

Study type(s)
Screening

Health condition(s) or problem(s) studied
Myocardial infarction, endothelial disease

Interventions
On the day of participation, a physical examination (cardiopulmonary system) will be performed by a physician prior to the start of the investigational intervention.

The investigational intervention is a remote ischaemic conditioning stimulus. Hereto, a pressure cuff will be placed on the upper arm and inflated to 200 mmHg for 5 minutes. Then, pressure will be released during 5 minutes allowing reperfusion, after which the cycle will be repeated three more times for a total of four cycles. The stimulus will be applied five minutes after T0 blood sampling. Five- and sixty minutes after completion of Remote Ischaemic Conditioning stimulus, T1 and T2 blood will be sampled. Each blood withdrawal will be taken by a separate venous puncture performed by a physician with extensive experience in this field.

For each experiment 100 µl serum per 6-well is needed. The experiment will be repeated three times for each cell type. 45% of the blood withdrawn is hematocrit, thus per time point 22cc blood will be sampled, after centrifugation (to separate cells from the serum) approximately 12cc serum will be left to do the in vitro experiments. In total, the volunteer gives 66cc blood. Samples will not be stored for purposes other than completion of the in vitro experiments.

Intervention Type
Other

Phase
Not Applicable

Primary outcome(s)
Lactate dehydrogenase enzyme (LDH) release in human umbilical vein endothelial cells measured at different time points in our in vitro model after incubation with the serum.

Key secondary outcome(s))
1. We measured mitogen activated protein kinase ERK 1/2, protein kinase B (AKT) and hypoxia inducible factor (HIF) 1 alpha in the endothelial cells by the use of western blotting at time point T0 before remote preconditioning and T1 (after 45 minutes, directly after the remote conditioning protocol).
2. We measured human vascular endothelial growth factor in the plasma of the volunteers also at T0 and T1.

Completion date
28/08/2012

Eligibility

Key inclusion criteria
Healthy male volunteers aged 18-45 years

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 years

Upper age limit
45 years

Sex
Male

Key exclusion criteria
1. Any cardiovascular, kidney, pulmonary or endocrine diseases
2. Alcohol or drug abuse
3. No informed consent

Date of first enrolment
15/06/2012

Date of final enrolment
28/08/2012

Locations

Countries of recruitment
Netherlands

Study participating centre
Academic Medical Center
Amsterdam
Netherlands
1105 AZ

Sponsor information

Organisation
Academic Medical Center (Netherlands)

ROR
https://ror.org/03t4gr691

Funder(s)

Funder type
University/education

Funder Name
Academisch Medisch Centrum

Alternative Name(s)
Academic Medical Center, AMC

Funding Body Type
Private sector organisation

Funding Body Subtype
Universities (academic only)

Location
Netherlands

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study are not expected to be made available due to the fact that during the inclusion the trialists did not get informed consent of the volunteers to make the raw data public.

IPD sharing plan summary
Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/03/2015	17/01/2019	Yes	No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes