Ethnic differences in vascular contractility and remodeling.

Published: 24-11-2008
Last updated: 06-05-2024

To study etnic differences in contractillity of the smooth muscle and to investigate the role of CK in this proces.

Ethical review	Approved WMO
Status	Pending
Health condition type	Vascular hypertensive disorders
Study type	Observational non invasive

Summary

ID

NL-OMON32640

Source
ToetsingOnline

Brief title
Ethnic differences in vascular contractility.

Condition

- Vascular hypertensive disorders

Synonym
high blood pressure, hypertension.

Research involving
Human

Sponsors and support

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

Intervention

Keyword: Contractile response, Creatine kinase, Hypertension, Smooth muscle

Outcome measures

Primary outcome

Primary Outcome Measure:

Ethnic difference in maximum endothelium-dependent relaxation.

Secondary outcome

Secondary Outcome Measures

Ethnic differences in:

1. Creatine kinase activity in vessels and in blood.

2. Vessel wall thickness as assessed by histological examination with light

microscopy and electron microscopy.

3. The maximal contraction at optimal diameter

4. noradrenalin contractility, vasodilatation in response to

endothelium-dependent bradykinin, calcium blockade, NO donation and creatine

kinase inhibition will be studied.

5. The response of the vessel wall to vessel culture.

Study description

Background summary

Previous studies have established that black people have an increased prevalence of essential hypertension compared with white people. The disease onset is earlier, and the consequences of hypertension, which include heart failure, myocardial infarction, stroke, and renal failure, are more pronounced in black patients.
One factor contributing to the development and progression of hypertension in blacks is hemodynamic reactivity characterized by greatly increased peripheral vascular resistance in response to external stimuli, including physical and

mental stress.
Regarding the mechanism for the increased peripheral vascular resistance in black patients, endothelial as well as muscular factors have been proposed. Vasoactive substances produced by endothelial cells such as endothelin-1 (ET-1) and NO are possible candidates to contribute to the vascular reactivity.
Regarding vascular smooth muscle factors, a vast amount of energy is needed for muscular contraction and development of hypertension. Cross bridge cycling and ion transport are the most energy demanding process in cellular metabolism and creatine kinase, the central regulatory enzyme of energy metabolism, serves as the major cellular ATP regenerating system for these cellular functions.
There are large inter-individual differences in creatine kinase activity in healthy people. In particular black people have very high skeletal muscle and serum creatine kinase activity, to be about eighty to a hundred percent higher than in white and other people.
We have therefore postulated that the genetic factor increasing the propensity of black people of sub-Saharan African descent to develop high blood pressures is relatively high activity of creatine kinase in tissue, increasing cardiovascular contractile reserve, enhance trophic responses and increase renal tubular ability to retain salt, facilitating the development of arterial hypertension under chronic provocative circumstances. In vascular smooth muscle, cGMP and cAMP dependent pathways are thought to inhibit contractility less effective than creatine kinase or calcium inhibitors, because the effect of creatine kinase is likely to depend on downstream targets of cyclic nucleotides related to calcium transients and myosin ATP-ase activity.

Study objective

To study etnic differences in contractillity of the smooth muscle and to investigate the role of CK in this proces.

Study design

I. Recruitment at the outpatient department.

II. Questionnaire and blood pressure measurement.
II.1. general questions:
We will ask the patients* permission to obtain medical information from his/her medical record and ask additional questions if necessary.

II.2. fainting specific questionnaire:
Historical data of the patient regarding to fainting will be collected preoperatively with the help of a specific questionnaire.

II.3. Physical examination:
We will measure blood pressure with a oscillometric device one day before surgery and six weeks thereafter. Measurements will be performed in seated

position, on the non-dominant arm at heart level.

III. Serum creatine kinase levels
CK levels in blood will be included with the standard preoperative assessment.

IV. Tissue biopsy and tissue study.
Resistance vessels will be isolated for contractility studies and histological examination, from omental fat of black and white men and women obtained during abdominal surgery, after informed consent is given.
The morphology will be studied with the help of ligth microscopy and electron microscopy. A wire-myograph will be used to study noradrenalin contractility, endothelium-dependent bradykinin relaxation, the vascular respons to calcium blockade, NO donation and creatine kinase inhibition. Finally we will asses tissue CK.

V. Vessel culture.
Culture of resistance vessels for 2-3 days.

Study burden and risks

Biopsies of fat are considered to be procedures with minimal risk. We have performed this procedure in more than 40 patients at our hospital without ill effects. There is no direct benefit for the individual, however we do expect long-term benefits for the ethnic group participants belong to.

Contacts

Public
Academisch Medisch Centrum

Meibergdreef 9
1105 AZ Amsterdam
NL
Scientific
Academisch Medisch Centrum

Meibergdreef 9
1105 AZ Amsterdam
NL

Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

Ethnicity
Age
Normotension
Abdominal surgery

Exclusion criteria

Vasculitis
Diabetes
HIV
Hepatitis B en C
Hypertension
Cardiovascular diseases
Bleeding tendency or use of anticoagulation medication (except incidental apspirine)

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Basic science

Recruitment

NL

Recruitment status:	Pending
Start date (anticipated):	01-11-2008
Enrollment:	20
Type:	Anticipated

Ethics review

Approved WMO

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
CCMO	NL25076.018.08