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Impact of EECP-treatment (Enhanced External Counterpulsation) on myocardial adaptive arteriogenesis in patients suffering from stable symptomatic coronary heart disease

Submission date
11/10/2007

Recruitment status
No longer recruiting

Registration date
18/12/2007

Overall study status
Completed

Last Edited
20/10/2008

Condition category
Circulatory System

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[_] Record updated in last year

Plain English summary of protocol
Not provided at time of registration

Contact information

Type(s)
Scientific

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Additional identifiers

EudraCT/CTIS number

IRAS number

ClinicalTrials.gov number

Secondary identifying numbers
N/A

Study information

Scientific Title

Acronym
Art.Net. 2 Trial

Study objectives
Please note that as of 20/10/2008 this record was updated due to the addition of a control arm to this pilot study. All changes can be found in the relevant field with the above update date. Please also note that Sweden was removed from the country of recruitment section, and the target number of participants was amended from 20 participants to 21 participants.

Main hypothesis:
To determine wether the application of 35 hours of Enhanced External Counterpulsation (EECP) in patients suffering from significant coronary artery disease leads to an improvement of myocardial perfusion and whether this improvement is due to recruitment and proliferation of collateral arteries. Assessment through invasive (Collateral Flow Index [CFIp], Fractional Flow Reserve [FFR]) and non-invasive methods (Cardiac Magnetic Resonance [CMR]). No change of the Collateral Flow Index is expected in the control group (added 20/10/2008).

Secondary hypothesis:
1. EECP improves systolic and/or diastolic ventricular dysfunction
2. Several plasma markers of arteriogenesis and angiogenesis are elevated during and after the intervention. The vascular endothelial function is improved after the course of EECP as assessed by the adaptation of endothelial plasma markers

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approval received from the Ethics Committee of Charite - Berlin Medical University (Universitaetsmedizin Berlin) in September 2006 (ref: EA3/009/06). Ethical addendum for the control group received on the 25th September 2008.

Study design
A phase I (pilot-study), intention to treat, prospective, non-randomised, controlled, multicentre, proof-of-concept study

Primary study design
Interventional

Secondary study design
Randomised controlled trial

Study setting(s)

Hospital

Study type(s)
Treatment

Participant information sheet

Health condition(s) or problem(s) studied
Coronary artery disease/arteriogenesis/endothelial function

Interventions
Current information as of 20/10/2008:
The EECP course consists of 35 1-hour sessions of therapy over 7 weeks. The therapy takes place in outpatient clinics. Patients in the control group visit the outpatient clinic three times per week and undertake weekly nutrition advice, diagnostic tests (twice exercise bicycle test, twice heart rate and blood-pressure monitoring, ultrasound diagnsotics) and an optimization of the medical treatment over the period of 7 weeks. In the control group as well as in the EECP group before and after treatment a coronary angiography and measurement of fractional flow reserve as well collateral flow index is performed. In the second coronary angiography - depending on the result of the FFR measurement and myocardial ischaemic tests - Percutaneous Coronary Intervention (PCI) is done or not.

Initial information at time of registration:
The EECP course consists of 35 1-hour sessions of therapy over 7 weeks. The therapy takes place in outpatient clinics. Before and after 35 hours EECP-treatment a coronary angiography and measurement of fractional flow reserve as well collateral flow index is performed. In the second coronary angiography - depending on the result of the FFR measurement and myocardial ischaemic tests - Percutaneous Coronary Intervention (PCI) is done or not.

Intervention Type
Other

Phase
Phase I

Primary outcome measure
Changes in CFIp and FFR indexes evaluated at baseline and after the 7 weeks therapy.

Secondary outcome measures
1. Changes in CMR perfusion at rest and under adenosine. Quantitative assessment (ml/min/g of myocardium)
2. Changes in the Ejection Fraction (EF) assessed through CMR and echocardiography
3. Changes in the Canadian Cardiovascular Society (CCS) classification of the angina pectoris and in the New York Heart Association (NYHA) classification of the heart failure
4. Treadmill test for ischaemic signs
5. Changes in the plasma levels of pro-arteriogenic and pro-angiogenic markers
6. Changes in the plasma levels of several markers of the endothelial function

The endpoints 1, 2, 3, 5, 6 are evaluated at baseline, after 2 weeks of therapy, after 7 weeks (end of EECP) and 6 months after the therapy. Point 4 is assessed at baseline and after 7 weeks.

Overall study start date
01/11/2007

Completion date
31/12/2008

Eligibility

Key inclusion criteria
1. Patients of both genders
2. Age greater than 30 to less than 80 years
3. Suffering from stable coronary vessel disease for more than 3 months
4. With an angiographically diagnosed haemodynamic significant stenosis of at least one epicardial vessel
5. An objective positive test for stress-induced ischaemic imaging and pathological Fractional Flow Reserve (FFR less than 0.8)

Participant type(s)
Patient

Age group
Adult

Sex
Both

Target number of participants
n = 21 (14 patients in the active group and 7 patients in the control group [2:1])

Key exclusion criteria
1. Unstable angina
2. After aorto-coronary bypass grafting
3. No previous Q-wave infarction in the area assessed for coronary collaterals
4. Non-ischaemic left ventricle dysfunction Ejection Fraction (EF) less than 35%, fluid overload
5. Tricuspid and aortic valve insufficiency greater than grade II and aortic valve stenosis greater than grade II
6. Relevant stenosis of the aorta abdominalis or aorta thoracica, coarctatio aortae
7. Symptomatic angiopathy of the lower limb (neuropathy, vasculitis, symptomatic Peripheral Arterial Disease [PAD] ankle pressure less than 80 mmHg)
8. Chronic venous insufficiency grade greater than III, symptomatic varicosis, thrombosis, occlusion of vena cava inferior, phlebitis
9. Evident lesions at the lower extremity (ulcera, big scar, etc.)
10. Diabetic retinopathy
11. Anticoagulation International Normalised Ratio (INR) greater than 3 or less and bleeding symptoms, disturbed homeostasis
12. Orthopaedic disease (hip, knee)
13. Severe systemic disease
14. Severe hypertension greater than 180 mmHg
15. Status post cerebral bleeding
16. Pregnancy

17. Mental retardation or dementia
18. Severe kinking of coronary vessels
19. Atrial fibrillation
20. Pacemaker (PM)/Implantable Cardioverter Defibrillator (ICD), metal valve
21. Acute renal insufficiency, progressive renal insufficiency, chronic renal insufficiency - cut off creatinine 2 mg/dl

Date of first enrolment
01/11/2007

Date of final enrolment
31/12/2008

Locations

Countries of recruitment
Germany

Study participating centre
HELIOS Klinikum Berlin
Berlin
Germany
13125

Sponsor information

Organisation
Charite - University Medicine Berlin (Charite - Universitatsmedizin Berlin) (Germany)

Sponsor details
ChariteCampus Buch
Franz-Volhard-Klinik am Max-Delbrück Centrum fur Molekulare Medizin
Medizinische Klinik mit Schwerpunkt Molekulare und Klinische Kardiologie
Berlin
Germany
D-13125

Sponsor type
Hospital/treatment centre

Website
http://www.charite.de/

ROR
https://ror.org/001w7jn25

Funder(s)

Funder type
Hospital/treatment centre

Funder Name
Center of Cardiovascular Research (Germany)

Results and Publications

Publication and dissemination plan
Not provided at time of registration

Intention to publish date

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not provided at time of registration