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Bone marrow transfer to enhance ST-elevation infarct regeneration-2

Submission date	Recruitment status	[X] Prospectively registered
06/10/2005	No longer recruiting	[_] Protocol
Registration date	**Overall study status**	[_] Statistical analysis plan
04/11/2005	Completed	[X] Results
Last Edited	**Condition category**	[_] Individual participant data
29/05/2020	Circulatory System	

Plain English summary of protocol
Not provided at time of registration

Contact information

Type(s)
Scientific

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Additional identifiers

Clinical Trials Information System (CTIS)
2005-000774-46

Study information

Scientific Title
BOne marrOw transfer to enhance ST-elevation infarct regeneration-2 (BOOST-2)

Acronym
BOOST-2

Study objectives
BOOST-2 examines three principle hypotheses:
1st hypothesis:
An intracoronary infusion of high-dose, non-irradiated Bone Marrow Cells (BMCs) is superior to an intracoronary infusion of control cells

2nd set of hypotheses:
1. An intracoronary infusion of high-dose BMCs (irradiated and non-irradiated) is superior to an intracoronary infusion of control cells
2. An intracoronary infusion of low-dose BMCs (irradiated and non-irradiated) is superior to an intracoronary infusion of control cells
3. Low-dose BMC-transfer (irradiated and non-irradiated) is not inferior to high-dose BMC-transfer (irradiated and non-irradiated)

3rd set of hypotheses:
1. An intracoronary infusion of non-irradiated BMCs (low-dose and high-dose) is superior to an intracoronary infusion of control cells
2. An intracoronary infusion of irradiated BMCs (low-dose and high-dose) is superior to an intracoronary infusion of control cells
3. Irradiated BMC-transfer (low-dose and high-dose) is not inferior to non-irradiated BMC-transfer (low-dose and high-dose)

Ethics approval required
Old ethics approval format

Ethics approval(s)
Added as of 03/08/2007: The final study protocol (version 7), has been approved by the Ethics Committee of Hannover Medical School in Hannover, Germany on 03/02/2006 (No. 3812M)

Primary study design
Interventional

Study design
Randomized-controlled double-blind multicenter clinical trial

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Acute ST-Elevation Myocardial Infarction (STEMI)

Interventions
BOOST-2 is a randomized-controlled, double-blind, multicenter clinical trial investigating the effects of intracoronary nucleated BMC-transfer in patients after Acute Myocardial Infarction (AMI). BOOST-2 will investigate whether intracoronary BMC-transfer will have an effect on Left Ventricular (LV) functional and structural regeneration and have an impact on clinical endpoints as compared to a placebo cell infusion (erythrocytes only). BOOST-2 will address a number of biological and procedural issues. Irradiation of BMCs will be performed in two groups of patients

just prior to intracoronary transfer. This study arm will reveal whether replication-competent cells (non-irradiated cells) are required for regeneration after AMI. In addition, BOOST-2 will address the question whether dose matters in BMC-therapy for AMI.

BOOST-2 has six groups of patients:
1. Low dose, placebo cell infusion (20 patients)
2. High dose, placebo cell infusion (20 patients)
3. Low dose, non-irradiated BMC infusion (40 patients)
4. High dose, non-irradiated BMC infusion (40 patients)
5. Low dose, irradiated BMC infusion (40 patients)
6. High dose, irradiated BMC infusion (40 patients)

Intervention Type
Biological/Vaccine

Phase
Not Applicable

Primary outcome(s)
Change in LV Ejection Fraction (LVEF) from baseline to 6 months follow-up (assessed by MRI).
The primary endpoint will be analyzed separately in four subgroups:
1. Patients with a baseline LVEF smaller/larger than the median of the study population (assessed by MRI)
2. Patients undergoing PCI/stenting earlier/later than the median in the study population
3. Patients with an infarct size smaller/larger than the median of the study population (assessed by late contrast enhancement MRI)
4. Patients with a functional regenerative capacity of the infused bone marrow cells smaller /larger than the median of the study population
Additional subgroups will be analyzed in an exploratory manner.

Key secondary outcome(s)
1. Change in LVEF from baseline to 18 months follow-up (assessed by MRI)
2. Changes in LV end-diastolic volume index, LV end-systolic volume index, infarct size (late enhancement), regional LV function, and myocardial perfusion from baseline to 6 and 18 months follow-up (assessed by MRI)
3. Changes in LV diastolic function from baseline to 6 and 18 months follow-up (echocardiography)
4. Exercise capacity at 6 and 18 months follow-up (cardiopulmonary exercise testing)
5. Quality of life (Minnesota Living with Heart Failure Questionnaire) and New York Heart Association (NYHA) class at 6 and 18 months follow-up
6. Combined clinical endpoint of death and hospitalization with heart failure

Completion date
01/01/2015

Eligibility

Key inclusion criteria
Inclusion criteria amended as of 03/08/2007:
The following is the new definition of inclusion criteria that has been effective since July 4th, 2007:

1. Age 30 years or older
2. First time STEMI
3. Time from symptom onset to reperfusion of >3 hours and baseline LV ejection fraction <57% as assessed by Magnetic Resonance Imaging (MRI) OR time from symptom onset to reperfusion between 1.5 and 3 hours and baseline LV ejection fraction <52% as assessed by MRI
4. Successful Percutaneous Coronary Intervention (PCI) and stent implantation of the infarct vessel (TIMI 2 or 3)
5. Severe hypokinesia or akinesia of >2/3 of the Left Ventricular (LV) anteroseptal, lateral, and /or inferior wall, as shown by LV angiography immediately after PCI/Stent
6. No previous infarction (late enhancement) in another territory as assessed by MRI
7.Written informed consent

Inclusion criteria provided at time of registration:
1. Age 30 years or older
2. First time STEMI
3. Time from symptom onset to reperfusion of >3 hours
4. Successful Percutaneous Coronary Intervention (PCI) and stent implantation of the infarct vessel (TIMI 2 or 3)
5. Severe hypokinesia or akinesia of >2/3 of the Left Ventricular (LV) anteroseptal, lateral, and /or inferior wall, as shown by LV angiography immediately after PCI/Stent
6. Baseline LV ejection fraction <57% as assessed by Magnetic Resonance Imaging (MRI)
7. No previous infarction (late enhancement) in another territory as assessed by MRI
8. Written informed consent

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Sex
All

Total final enrolment
153

Key exclusion criteria
1. Multi-vessel coronary artery disease requiring repeat PCI or coronary bypass
2. Pulmonary edema requiring intubation, cardiogenic shock
3. Pregnancy or unreliable contraception
4. Terminal illness or cancer
5. Advanced hepatic or renal disease, acute or chronic hepatitis, or Human Immunodeficiency Virus (HIV) infection
6. Acute systemic infection/inflammation or fever
7. Severe thrombocytopenia or anemia, coagulopathy
8. Known hypersensitivity or allergy to parts of the cell preparation reagents or other applied medicinal products (e.g. midazolam, etomidate)
9. Cardiac pacemaker or implantable cardioverter-defibrillator, claustrophobia and severe

obesity
10. Patients participating in another investigational trial within the last 30 days
11. Any other condition which, in the judgement of the investigator, might increase the risk to the patient or preclude the satisfactory ability to collect trial relevant experimental or clinical data
12. Patients who were exposed to ionizing radiation within the last 10 years

Date of first enrolment
06/02/2006

Date of final enrolment
01/01/2015

Locations

Countries of recruitment
Bulgaria

Germany

Norway

Study participating centre
Hannover Medical School
Hannover
Germany
30625

Sponsor information

Organisation
Individual Sponsor (Germany)

Funder(s)

Funder type
Research organisation

Funder Name
German Research Foundation (Deutsche Forschungsgemeinschaft) (ref: DR 148/13-1)

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not provided at time of registration

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	14/10/2017	29/05/2020	Yes	No