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Cardiac side effects of chemotherapy with anthracyclines in sarcoma patients assessed by cardiac MRI

Submission date
14/07/2017

Recruitment status
No longer recruiting

Registration date
11/08/2017

Overall study status
Completed

Last Edited
29/01/2020

Condition category
Injury, Occupational Diseases, Poisoning

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

Plain English summary of protocol

Background and study aims
It has been known since the 1970s that chemotherapy with anthracyclines can have adverse side effects on heart function. Between 5 and 30% of all patients treated with anthracyclines develop a decrease in heart function. Nevertheless, anthracyclines play a pivotal role in the treatment of many cancers, such as breast cancers and cancer of the connective tissue (sarcomas). With the fortunate development of increasing numbers of cancer survivors the long-term side effects of chemotherapy become more and more important. The current strategy of assessment of patients for development of heart failure under chemotherapy is mainly based on close observation using ultrasound. There is currently no reliable tool for predicting heart failure under chemotherapy before it actually occurs, or tools for identifying patients at highest risk. MRI is the gold standard for assessment of heart function and has the unique ability to also assess changes in the heart muscle which are known to predict the development of subsequent heart failure. It is thought that chemotherapy with anthracyclines leads to very early changes in the tissue of the heart muscle. These changes may be detectable by MRI and may help to predict the development of heart failure at a much later point in time. Hence, the aim of this study is to assess changes in the heart tissue before and very early (24-48 hours) after the first treatment with anthracyclines using MRI and compare these changes to the development of heart function at the end of chemotherapy treatment (usually after 4-5 months) also assessed by MRI.

Who can participate?
Patients aged at least 18 with sarcoma undergoing chemotherapy with anthracyclines

What does the study involve?
All patients receive three standard MRI scans - one scan before the start of chemotherapy, one 24-48 hours after the first treatment and one 3-4 weeks after the end of chemotherapy. The first and the last MRI scan are part of a normal exam and only the second MRI scan is performed merely due to study participation. Participants also provide blood samples and their heart electrical activity is recorded (electrocardiography [ECG]) at the time of each MRI scan.

What are the benefits and risk of participating?
Benefits include a closer observation of heart function through participation in this study. Extraordinary findings are reported to the referring doctors. One of the three MRI scans is additional and merely performed due to study participation. Since the other two MRI scans are performed anyway, there is no additional burden from a patient's perspective besides the single additional MRI exam.

Where is the study run from?
HELIOS Clinic Berlin-Buch (Germany)

When is the study starting and how long is it expected to run for?
October 2014 to December 2016

Who is funding the study?
1. Charité Universitätsmedizin Berlin (Germany)
2. HELIOS Kliniken (Germany)

Who is the main contact?
Prof. Jeanette Schulz-Menger

Contact information

Type(s)
Scientific

Contact name
Prof Jeanette Schulz-Menger

Contact details
Charité University Medicine Berlin
Campus Buch
Working group Kardiale MRT
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Germany
13125

Additional identifiers

EudraCT/CTIS number

IRAS number

ClinicalTrials.gov number

Secondary identifying numbers
CARETOX-1

Study information

Scientific Title
Assessment of the predictive value of cardiac MRI in anthracycline-induced cardiomyopathy in sarcoma patients

Acronym
CARETOX-1

Study objectives
Early changes in cardiac tissue morphology assessable by cardiac MRI can predict the development of subsequent cardiomyopathy in sarcoma patients treated with anthracyclines.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Ethics board at Charité University Medicine Berlin, Campus Mitte, 23/09/2014, ref: EA1/262/14

Study design
Observational cohort study

Primary study design
Observational

Secondary study design
Cohort study

Study setting(s)
Hospital

Study type(s)
Diagnostic

Participant information sheet
Not available in web format, please use the contact details to request a patient information sheet.

Health condition(s) or problem(s) studied
Anthracycline-induced cardiomyopathy in patients with sarcoma

Interventions
Cardiac tissue morphology is assessed in sarcoma patients treated with anthracycline-based chemotherapy using cardiac MRI. Patients receive at least three cardiac MRI scans: before start of chemotherapy (baseline), 24-48 hours after the first treatment and 3-4 weeks after completion of chemotherapy (usually after 4-5 months).

Blood analysis is carried out at the time of each MRI scan: NTproBnP, high-sensitive Troponin T, hematocrit, glomerular filtration rate. ECG is also carried out at the time of each MRI scan.

Intervention Type
Procedure/Surgery

Primary outcome measure
Myocardial T1 and T2 times, measured using parametric mapping techniques before start of chemotherapy (baseline), 24-48 hours after the first treatment and 3-4 weeks after completion of chemotherapy (usually after 4-5 months).

Secondary outcome measures
Measured before start of chemotherapy (baseline), 24-48 hours after the first treatment and 3-4 weeks after completion of chemotherapy (usually after 4-5 months):
1. Left and right atrial and ventricular size and function, measured in CINE sequences
2. Detection and size of myocardial fibrosis using late gadolinium enhancement techniques
3. Detection of arrhythmia using ECG
4. Laboratory blood analysis parameters (NTproBNP, hematocrit, high sensitive troponin T, glomerular filtration rate)

Overall study start date
01/10/2014

Completion date
31/12/2016

Eligibility

Key inclusion criteria
1. Histologically confirmed sarcoma diagnosis
2. Planned chemotherapy with anthracyclines (cumulative dose >300 mg/m2 doxorubicin-equivalent)
3. Age at least 18 years (no upper limit)

Participant type(s)
Patient

Age group
Adult

Lower age limit
18 Years

Sex
Both

Target number of participants
30 patients with first exposure to anthracyclines, 30 patients with re-exposure to anthracyclines

Key exclusion criteria
1. Any contraindication for contrast-based MRI
2. Chronic renal failure (glomerular filtration rate <30ml/min)
3. Previous participation in this study

Date of first enrolment
01/10/2014

Date of final enrolment
31/12/2019

Locations

Countries of recruitment
Germany

Study participating centre
HELIOS Clinic Berlin-Buch
Berlin
Germany
13125

Sponsor information

Organisation
Charité University Medicine Berlin

Sponsor details
Working Group Kardiale MRT
Lindenberger Weg 80
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13125

Sponsor type
University/education

Website
http://www.cmr-berlin.org

ROR
https://ror.org/001w7jn25

Funder(s)

Funder type
University/education

Funder Name

Charité Universitätsmedizin Berlin

Alternative Name(s)
Medical School - Charité - University Medicine Berlin

Funding Body Type
Private sector organisation

Funding Body Subtype
For-profit companies (industry)

Location
Germany

Funder Name
HELIOS Kliniken

Alternative Name(s)
HELIOS Kliniken GmbH

Funding Body Type
Private sector organisation

Funding Body Subtype
For-profit companies (industry)

Location
Germany

Results and Publications

Publication and dissemination plan
Results of this study shall be published in two high-ranking peer-reviewed journal publication. One publication for each study group (group 1: first exposure to anthracyclines, group 2: re-exposure to anthracyclines - for details see above).

Intention to publish date
28/02/2018

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 data protection laws in Germany. However, upon request methodology and dataset structure can be shared.

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	01/08/2018	03/07/2019	Yes	No
Results article	results	21/02/2019	29/01/2020	Yes	No