ISRCTN80063369 https://doi.org/10.1186/ISRCTN80063369

Iron Status In Decompensated Heart Failure (IRON STATS-DHF)

Submission date
06/06/2014

Recruitment status
No longer recruiting

Registration date
15/08/2014

Overall study status
Completed

Last Edited
29/05/2020

Condition category
Circulatory System

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

Plain English summary of protocol

Background and study aims
Anaemia occurs in up to 30% of heart failure patients. A deficiency in iron is a common cause of anaemia in heart failure. Studies have shown anaemia to be an independent risk factor for death and hence there has been much interest in finding out the possible role of treating iron deficiency in improving outcomes. The answers are not clear as large studies are needed. The mechanism of anaemia and iron deficiency in heart failure is not fully understood. In particular, it is unknown what happens to iron levels when someone with heart failure gets admitted to hospital with excess fluid requiring treatment with drugs given through the vein (intravenous). Whether a potential iron deficiency detected when unwell gets better with time and whether this has any impact is unclear. This study will find out the mechanism of anaemia and iron deficiency in patients with heart failure.

Who can participate?
We will recruit 100 patients admitted to the participating hospital with heart failure needing intravenous treatment with diuretics (water tablets). We will compare our findings to a control group of participants with heart failure but who have not had a hospital admission for 3 months and 20 healthy individuals with no medical conditions requiring treatment.

What does the study involve?
For participants admitted to hospital with heart failure:
We will collect information on age, gender, medical conditions and medication details. We will perform an ECG, an echocardiogram (ultrasound scan of the heart) and carry out blood tests. The blood tests will be performed at the earliest opportunity after admission to hospital and will be repeated 24 hours prior to being discharged home. Blood tests are frequently performed (often on a daily basis) during hospital stay and where possible, we would aim to order our additional specialist tests on the same samples. This may involve having to withdraw an additional 15 ml of blood during routine blood test sampling. Before being discharged from hospital the participant will be asked to fill in a quality of life questionnaire and do a 6-minute walk test (a test often used to assess the functional status of heart failure patients that would involve assessing how far and how comfortably the participant can walk during a 6-minute period). Participation in the study will last 12 months, although no follow-up visits will be required after 3 months. There will be two clinic visits after discharge form hospital, at 4 weeks and 12 weeks after discharge from

hospital. At each of these follow-up visits, the blood tests, ECG and 6-minute walk test will be repeated and the participant will be required to fill in the quality of life questionnaire.

For stable participants:
There will be two visits involved, 3 months apart. At the first visit, we will collect information on age, gender, medical conditions and medication details. We will perform an ECG, an echocardiogram (ultrasound scan of the heart) and do some blood tests. The participant will also be required to fill in a quality of life questionnaire and do a 6-minute walk test. At the second visit, we will repeat the blood tests, ECG, 6-minute walk test and the participant will be required to fill in the quality of life questionnaire again.

For healthy participants:
There will be a single visit where we will collect information on age, gender, medical conditions and medication details. We will perform an ECG, an echocardiogram (ultrasound scan of the heart) and do some blood tests. The participant will also be required to do a 6-minute walk test.

Every participants general practitioner (GP) will be informed of their participation and we will contact the GP 12 months into the study via telephone for information regarding hospitalizations or any other medical events in the interim.

What are the possible benefits and risks of participating?
There is no new treatment involved and as such there are no changes to routine clinical care. While there is no assurance that the participant will immediately benefit from this study, whatever information we gather will be highly beneficial to our understanding of the research subject and we hope will ultimately lead to better management of anaemia and iron deficiency in patients with heart failure. The risks are very minimal as there are no new treatments involved. All blood tests will be performed by highly skilled personnel to minimize whatever potential discomfort this could cause.

Where is the study run from?
The study will take place at Queen Alexandra Hospital, Cosham, Portsmouth, UK. All clinics will be held at the Cardiology department in the hospital.

When is the study starting and how long is it expected to run for?
The study started in February 2014 and will run for a year.

Who is funding the study?
Alere International (UK).

Who is the main contact?
Ms Charlotte Turner
charlotte.turner@porthosp.nhs.uk

Contact information

Type(s)
Scientific

Contact name
Ms Charlotte Turner

Contact details
Southwick Hill Road
Cosham
Portsmouth
United Kingdom
PO6 3LY

Additional identifiers

Protocol serial number
16223

Study information

Scientific Title
Iron Status In Decompensated Heart Failure (IRON STATS-DHF) - an observational study aimed at assessing the prevalence of iron deficiency in decompensated heart failure and prospectively evaluating the change in iron status and association with renal function/inflammatory mediators with clinical improvement

Acronym
IRON STATS-DHF

Study objectives
Our study will focus on acute decompensated heart failure (ADHF) with the hypothesis that:
1. Iron deficiency is common in acute decompensated heart failure (ADHF).
2. Iron deficiency in ADHF is related to inflammatory immune activation and upregulation of hepcidin.
3. Iron deficiency at discharge from hospital following a decompensation, regardless of subsequent variations, will be a predictor of death and cardiovascular hospitalization (primary diagnosis of arrhythmia, ADHF or myocardial infarction) in the 12 months from original recruitment to the study.
4. Following ADHF, serum transferrin saturation (a marker of iron deficiency) is reduced at 4 weeks post discharge as a consequence of inflammatory immune activation and impaired renal function (even though recompensation has occurred).

Additional objectives:
To enhance our understanding of the dynamic relationship between ADHF, alterations in inflammatory immune activation, renal function and iron deficiency, we would be comparing the various blood parameters in the ADHF cohort at discharge from hospital, as well as at 4 weeks and 12 weeks from discharge. A comparison would also be made with a stable chronic heart failure cohort. We foresee a persistent dip in iron levels in the ADHF cohort that does not recover to baseline despite recompensation.

Ethics approval required
Old ethics approval format

Ethics approval(s)
NRES Committee South Central, Portsmouth; 29/11/2012; ref. 12/SC/0536

Study design
Non-randomised; Observational; Design type: Cohort study

Primary study design
Observational

Study type(s)
Screening

Health condition(s) or problem(s) studied
Topic: Cardiovascular disease; Subtopic: Cardiovascular (all Subtopics); Disease: Heart Failure

Interventions
Blood sampling, ECG, 6MWT. In addition to blood sampling on each study visit, participants will have to fill in a Kansas city cardiomyopathy questionnaire and have an ECG. Some visits will require an echocardiogram.

Intervention Type
Other

Phase
Not Applicable

Primary outcome(s)
1. Prevalence of iron deficiency (absolute and functional) in acute decompensated heart failure
2. Change in iron status (transferrin saturation) at 4 and 12 weeks

Key secondary outcome(s))
1. Is iron deficiency independently predicted by:
1.1. Haemoglobin level
1.2. Hepcidin level
1.3. Renal function using serum creatinine
1.4. Serum urate
1.5. Inflammatory markers (C-reactive protein (CRP), Interleukin [IL] -1, IL-6)
1.6. Biomarkers of heart failure (B-natriuretic peptide [BNP]) and renal function (N-gal)
1.7. Right heart pressures assessed on trans-thoracic echocardiogram
1.8. Fluid loss during inpatient stay (assessed from daily weight charts maintained during in-patient stay)
1.9. 6-Minute Walk Test (6MWT) performed as per American Thoracic Society guidelines
1.10. Quality of Life assessed by using The Kansas City Cardiomyopathy Questionnaire (KCCQ)
2. Compare prevalence of iron deficiency between patients in systolic heart failure (LVEF <45%) vs diastolic heart failure and atrial fibrillation vs sinus rhythm.
3. Using a multivariate model and logistic regression analysis, we will ascertain whether the changes in iron status (change in transferrin saturation) post discharge from hospital are independently related to:
3.1. Blood parameters (haemoglobin, hepcidin, renal function, urate, inflammatory markers [CRP, TNF- α, IL-1 and IL-6], biomarkers BNP, N-gal)
3.2. Right heart pressures assessed on trans-thoracic echocardiogram
3.3. Fluid loss during inpatient stay
3.4. 6-Minute Walk Test (6MWT)
3.5. QOL assessed by using The Kansas City Cardiomyopathy Questionnaire

3.6. Presence of systolic (LVEF <45%) or diastolic heart failure
4. We will additionally assess prognosis defined as outcomes at 1 year (death and hospitalisation) in:
4.1. ADHF patients with iron deficiency vs no iron deficiency
4.2. ADHF patients with iron deficiency vs stable CHF patients with iron deficiency

Completion date
16/02/2015

Eligibility

Key inclusion criteria
Study arm - acute decompensated heart failure (ADHF) patients:
1. Patients admitted with acute decompensated heart failure (defined as symptoms and signs secondary to abnormal cardiac function with weight gain of more than 3 kg above target weight or requiring intravenous diuretics for >48 hours).
2. Patients should be able to give informed consent.

Control arm - patients with stable heart failure:
1. There should be a prior diagnosis of CHF based on the presence of signs and symptoms of heart failure with objective evidence of a structural or functional abnormality of the heart at rest.
2. Patients should already be established on therapy, i.e. diuretics if required, ACE inhibitors /ARBs, beta blockers and aldosterone antagonists.
3. They should not have had a hospitalisation in the last 3 months.

Control arm - healthy age-matched particpants:
1. There should be no known cardiac abnormality or history of anaemia or iron deficiency.
2. They should not have any chronic conditions requiring aspirin, beta blockers, ACE inhibitors, ARBs or aldosterone antagonist therapy in the last 3 months.

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Sex
All

Key exclusion criteria
1. Patients less than 18 years of age
2. Patients who are part of any other ongoing research study
3. Hospitalisation for stable heart failure or age-matched control patient in the last 3 months

Date of first enrolment
18/02/2014

Date of final enrolment
16/02/2015

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Southwick Hill Road
Portsmouth
United Kingdom
PO6 3LY

Sponsor information

Organisation
Portsmouth Hospitals NHS Trust (UK)

ROR
https://ror.org/009fk3b63

Funder(s)

Funder type
Industry

Funder Name
Alere International (UK)

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?
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes