ISRCTN34122839 https://doi.org/10.1186/ISRCTN34122839

Platelets in out of hospital cardiac arrest

Submission date	Recruitment status	[X] Prospectively registered
03/08/2016	No longer recruiting	[X] Protocol
Registration date	**Overall study status**	[_] Statistical analysis plan
09/08/2016	Completed	[X] Results
Last Edited	**Condition category**	[_] Individual participant data
14/08/2019	Circulatory System	

Plain English summary of protocol

Background and study aims

A cardiac arrest occurs when the heart stops pumping. It is an extreme medical emergency. About 31,000 people receive resuscitation for out of hospital cardiac arrests (OHCA) in the UK each year. Sadly less than 1 in 10 of these people survive to leave hospital. This makes OHCA a frequent yet deadly event. The most common reason for a cardiac arrest is a heart attack, where a clot occurs in a blood vessel and stops blood flowing to the muscle of the heart. After the heart has started beating again it is vital to get blood flowing back to the muscle of the heart. We know from research that the best way to unblock the blood vessel is for a cardiologist to remove the clot and insert a small mesh tube (stent) into the vessel. However, after a stent has been placed the risk of a clot forming again is high. If a clot develops in this new stent it may have catastrophic results and may lead to death. To prevent any new clots forming the cardiologist will give blood thinners during the procedure and antiplatelet medicines to stop the platelets (the cells in the blood responsible for forming clots) from working afterwards. Research into anti-platelet medicines is usually carried out in healthy human volunteers and very little is known about how these medications work in survivors of OHCA. As such it is unclear how well these medications work or how soon they should be given after a cardiac arrest. It is also known that medical hypothermia (cooling), which is given to people after OHCA to limit brain damage, can make people more likely to bleed, a situation that may be made worse after giving anti-platelet medicines. Finally, we do not know if people who have suffered an OHCA have abnormal clotting even before they are given these medicines. In caring for survivors of OHCA it is vital to balance the risk of clots versus the risk of bleeding but at present there is limited evidence how best to do this. The aim of this study is to answer these uncertainties by testing how the blood clots in survivors of OHCA who have been given anti-platelet medicines and cooled in intensive care. These blood results will be compared to those from patients who suffer a heart attack but do not have an OHCA.

Who can participate?

Adults brought to the Bristol Royal Infirmary after an OHCA or with a heart attack

What does the study involve?

To assess how blood is clotting five blood tests are carried out at specific time points in the first 48 hours after the participant arrives in the hospital. The first blood test straight after admission shows what abnormalities are present after OHCA, before any medicine is given. Four other blood tests are carried out (after the stent is put in, and 12 hours, 24 hours and 48 hours

afterwards) to see how clotting and platelet function are affected by antiplatelet medicines and medical hypothermia. Blood samples are taken at the same times from participants who have received stent emergency treatment for a heart attack. These blood samples are first tested at the time they are taken to give an immediate clotting result. The remaining blood is then treated and the plasma (the liquid part of the blood) is frozen and stored for specialised clotting tests at the end of the study. Any remaining plasma is stored in the Bristol Biobank long term to allow any future researchers looking into cardiac arrest to have access to these samples. This sample is completely anonymous and is untraceable back to the participant.

What are the possible benefits and risks of participating?
Although there are no direct benefit to the participants, the knowledge gained may improve care for survivors of OHCA in the future. Participants do not receive any experimental treatments as a result of taking part in this trial. All the medicines given are prescribed by doctors not involved in the study, as if the participant were not part of the study. This means that there is very little risk in taking part in this study.

Where is the study run from?
Bristol Royal Infirmary (UK)

When is the study starting and how long is it expected to run for?
September 2016 to April 2017

Who is funding the study?
Bristol Cardiovascular Biomedical Research Unit and the National Institute for Health Research (UK)

Who is the main contact?
Dr Agnieszka Skorko

Contact information

Type(s)
Scientific

Contact name
Dr Agnieszka Skorko

ORCID ID
https://orcid.org/0000-0001-8322-7099

Contact details
Bristol Royal Infirmary
Intensive care unit A600
University Hospitals Bristol NHS Foundation Trust
Bristol
United Kingdom
BS2 8HW

Additional identifiers

Integrated Research Application System (IRAS)
199298

Protocol serial number
IRAS project number: 199298

Study information

Scientific Title
A pilot investigation of coagulation and platelet function in the era of modern antiplatelet therapy and targeted temperature management for the treatment of acute coronary events after out of hospital cardiac arrest

Acronym
PoHCAR

Study objectives
An out of hospital cardiac arrest (OHCA) is a sudden catastrophic event, most commonly as a result of a heart attack; an ST elevation myocardial infarction (STEMI) due to clot formation in a coronary artery. STEMI treatment requires rapid restoration of blood flow through the blocked artery, performed by percutaneous coronary intervention (PCI) and stent insertion. In order to prevent re-clotting of this stent antiplatelet medications (DAPTs) are given.

The timing and dose of DAPTs given to OHCA survivors are based on evidence extrapolated from non-OHCA patients, and this data may not be transferrable. Data suggests that blood after OHCA may be in a pro-clotting state. Additionally, we have a number of reasons to suppose that the DAPTs may not actually work effectively after OHCA and so expose the survivor to life-threatening clotting complications such as in-stent thrombosis.

The need to prevent clots needs to be balance against the risk of bleeding. OHCA patients undergo a number of interventions that increase their risk of serious bleeding. Chief amongst these is medical hypothermia which is vital to minimise brain injury but is known to increase bleeding risk.

This observational, hypothesis generating study will study the changes in coagulation and platelet function that occur in survivors of OHCA over 48 hours after ICU admission. These changes will be compared to those seen in individuals who suffer a STEMI but do not suffer a cardiac arrest.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Wales 7 Research Ethics Committee, 27/05/2016, REC ref: 16/WA/0161

Study design
Single-center observational case-control trial

Primary study design
Observational

Study type(s)
Other

Health condition(s) or problem(s) studied
Out of hospital cardiac arrest, ST elevation myocardial infarction

Interventions
Single-center observational case-control trial will assess coagulation and platelet function (using the ROTEM delta and TEM platelet machines) in survivors of cardiac arrest, over a period of 6 months at a regional cardiac arrest center.

A total of 5 blood tests will be taken at specified time points within the first 48 hours after admission and processed on the ROTEM machine. The first blood test will be taken immediately after admission to the Emergency Department. Four further blood tests will be taken after PCI, and 12 hours, 24 hours and 48 hours after PCI.

As a comparison, the same clotting and platelet tests will be measured in STEMI patients who undergo PCI but have not suffered a cardiac arrest.

Data will also be collected on complication rates in each group over the first 30 day after recruitment.

As a pilot, part of this study is hypothesis generation. We will assess which data can be readily and accurately collected in terms of 30-day follow-up. Collecting data on the incidence of various complications will assist in power calculations of future studies.

Intervention Type
Other

Primary outcome(s)
Coagulation and platelet function in Utstein cohort patients admitted to intensive care (ICU) after out of hospital cardiac arrest (OHCA), and how these change after routine medical interventions given to survivors of OHCA. The primary outcome will be measured via a combination of bedside thromboelastometric assessment of whole blood coagulation using the ROTEM® delta and platelet module and the biochemical analysis of plasma. The thromboelastometric analysis will be performed at five time points; immediately on admission, after the completion of percutaneous coronary intervention (PCI) and 12 hours, 24 hours and 48 hours post PCI. The serum from each time point will then be frozen and batch testing will occur at the end of the study.

Key secondary outcome(s))
Rates of bleeding, blood transfusion and in-stent thrombosis within 30 days of admission by recording the instances and frequency of each occurrence (from medical notes review)

Completion date
06/04/2017

Eligibility

Key inclusion criteria

OHCA group:
Any individual admitted to the Emergency Department following OHCA with return of spontaneous circulation (ROSC), who meets the Utstein criteria will be enrolled immediately upon arrival. The Utstein group is an internationally defined cohort of individuals who have a witnessed cardiac arrest, likely due to a heart attack and have a specific heart rhythm (VF or pulseless VT) on arrival of the Emergency Medical Service.

For the STEMI group:
Any patient brought to the coronary catheter laboratory or ED deemed to be having a STEMI by the clinical team and offered primary PCI will be eligible for enrolment.

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Sex
All

Total final enrolment
60

Key exclusion criteria
1. Patients currently detained by Her Majesty's Prison Service
2. Patients detained under the Mental Capacity act
3. Patients known or suspected to be pregnant
4. Patients known to lack capacity, for example known to have dementia

The following OHCA patients will not be enrolled:
1. Patients who suffer an in-hospital cardiac arrest
2. Patients who arrive in ED in cardiac arrest and fail to achieve or maintain ROSC within 10 minutes
3. Patients who have an unwitnessed arrest, OR an initial rhythm that is not ventricular fibrillation or ventricular tachycardia OR have an obvious non-cardiological cause (and so fail to meet Utstein criteria)
4. Patients who have sustained ROSC but who it is felt will not benefit from admission to intensive care. The decision as to ICU suitability will be undertaken by the clinical team

With regard to the STEMI group:
1. Patients not meeting the ESC criteria for STEMI
2. Patients lacking capacity (as deemed by the clinical team)
3. Patients undergoing rescue PCI
4. Patients not offered primary PCI
5. Patients who have a period of cardiac arrest but regain consciousness

Date of first enrolment
05/09/2016

Date of final enrolment
06/03/2017

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Bristol Royal Infirmary
University Hospitals Bristol NHS Foundation Trust
Bristol
United Kingdom
BS2 8HW

Sponsor information

Organisation
University Hospitals Bristol NHS Foundation Trust (UK)

ROR
https://ror.org/04nm1cv11

Funder(s)

Funder type
Government

Funder Name
Bristol Cardiovascular Biomedical Research Unit (BRU)

Funder Name
National Institute for Health Research Integrated Academic Training Programme for Doctors and Dentists

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/03/2019	14/08/2019	Yes	No
Protocol article	protocol	10/07/2017	14/08/2019	Yes	No
HRA research summary			28/06/2023	No	No