

Causes of brain injury during heart surgery

Submission date 27/11/2018	Recruitment status No longer recruiting	☐ Prospectively registered ☐ Protocol
Registration date 28/11/2018	Overall study status Completed	☐ Statistical analysis plan ☒ Results
Last Edited 06/07/2020	Condition category Circulatory System	☐ Individual participant data

Plain English summary of protocol

Background and study aims

Brain injury is a well known risk of heart surgery, but the exact causes are poorly understood. The aim of this study is to detect new brain injuries following heart surgery using an MRI brain scan, and by asking patients to perform a series of puzzles and language tasks assessing memory and brain function. Tests will be performed before and after surgery for comparison with the patients' medical records and type of surgery to help identify the causes of brain injury.

Who can participate?

Patients having heart surgery can join the study if it is safe for them to have an MRI scan, and their level of English is sufficient to complete the language tasks.

What does the study involve?

The study involves having an MRI brain scan lasting around 30 mins, and undergoing a series of puzzles and tests lasting approximately 1 hour. The brain scan and tests are performed twice: before the operation, and then 6-8 weeks afterwards. This will allow the study team to confidently identify new brain injuries. Patients also receive monitoring of brain blood flow during surgery using ultrasound, and we will obtain information about the patient's risk factors and type of surgery from medical records to explore potential causes of brain injury.

What are the possible benefits and risks of participating?

The MRI and ultrasound monitoring methods used in this study are low-risk and not harmful. If the brain MRI scan reveals any unexpected medical problems we will notify the patient's doctor. Otherwise, there are no direct benefits to the patient, although the results of our research may benefit patients in the future.

Where is the study run from?

This study takes place at Leicester Glenfield Hospital.

When is the study starting and how long is it expected to run for?

September 2010 to December 2014

Who is funding the study?

The British Heart Foundation

Who is the main contact?

The main contact is Dr Emma Chung, Lecturer, Department of Cardiovascular Sciences, University of Leicester. emlc1@le.ac.uk

Contact information

Type(s)

Public

Contact name

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Additional identifiers

Protocol serial number

UKCRN ID: 11702

Study information

Scientific Title

Brain Injury following Cardiac Interventions (BICI)

Acronym

BICI

Study objectives

This observational study investigates brain injury following cardiac surgery involving cardiopulmonary bypass using transcranial Doppler (TCD) ultrasound, MRI, and cognitive testing.

Ethics approval required

Old ethics approval format

Ethics approval(s)

University Hospitals of Leicester NHS Trust and Derbyshire Research Ethics Committee, 18/05 /2011, ref: 10/H0401/78

Primary study design

Observational

Study design

Observational cross-sectional study

Study type(s)

Diagnostic

Health condition(s) or problem(s) studied

Cardiac surgery with Cardiopulmonary Bypass

Interventions

All eligible participants are invited to take part in the study after their cardiac surgery consultation and provided with a patient information leaflet. Participants interested in taking part in the research study are scheduled in for an MRI scan and a battery of cognitive tests prior to their surgical procedure. All participants undergo intra-operative bi-lateral transcranial ultrasound monitoring of the middle cerebral artery during their cardiac surgery. This ultrasound recording of the blood flow of the cerebral arteries is recorded for the entire procedure. The participants are invited for a follow-up 6 to 8 weeks after surgery, which includes a second MRI scan and the same battery of cognitive tests. On completion, this completes the participants involvement in the study.

Intervention Type

Mixed

Primary outcome(s)

Number and size of brain lesions assessed using 3T MRI imaging (including diffusion-weighted imaging, fluid-attenuated inversion recovery, time of flight angiography, susceptible weighted imaging and T1 and T2 volumetric measurements) before surgery and 6-8 weeks post-surgery

Key secondary outcome(s)

1. Cognitive ability (including speed of information and language processing, attention and psychomotor speed) assessed using WASI test (via Block Design, Pattern Matrices, and Similarities and Vocabulary tests), Trail Making Parts A and B, WMS-III digit span task, SCOLP test and Grooved Pegboard test before surgery and 6-8 weeks post-surgery
2. Interruption to blood flow to the brain and presence of emboli during the surgical procedure assessed using intra-operative transcranial ultrasound monitoring of the middle cerebral artery
3. Presence/absence of risk factors for cognitive decline assessed by reviewing the participant's medical records

Completion date

25/05/2015

Eligibility

Key inclusion criteria

1. Undergoing cardiac surgery involving cardiopulmonary bypass
2. Native English speaker (for neuropsychological tests)
3. Eligible to undergo MRI scan

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Adult

Sex

All

Key exclusion criteria

Unable to take neuropsychological tests

Date of first enrolment

25/07/2011

Date of final enrolment

17/12/2014

Locations**Countries of recruitment**

United Kingdom

England

Study participating centre

University Hospitals of Leicester NHS Trust

Glenfield Hospital

Leicester

United Kingdom

LE1 5WW

Sponsor information**Organisation**

University of Leicester

ROR

<https://ror.org/04h699437>

Funder(s)

Funder type

Charity

Funder Name

British Heart Foundation

Alternative Name(s)

The British Heart Foundation, the_bhf, BHF

Funding Body Type

Private sector organisation

Funding Body Subtype

Trusts, charities, foundations (both public and private)

Location

United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan

The datasets generated and/or analysed during the current study during this study will be included in the subsequent results publication.

IPD sharing plan summary

Other

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/02/2019		Yes	No
Results article	results	15/09/2020	06/07/2020	Yes	No
Participant information sheet	version v3	23/08/2011	28/11/2018	No	Yes