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Cognitive function and surgical success following pulmonary endarterectomy. A randomised controlled trial to compare deep hypothermic circulatory arrest with selective anterograde cerebral perfusion

Submission date 28/09/2007	**Recruitment status** No longer recruiting	[_] Prospectively registered [_] Protocol [_] Statistical analysis plan [X] Results [_] Individual participant data
Registration date 28/09/2007	**Overall study status** Completed	
Last Edited 19/10/2011	**Condition category** Surgery	

Plain English summary of protocol
Not provided at time of registration

Contact information

Type(s)
Scientific

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Additional identifiers

Protocol serial number
N0542185303

Study information

Scientific Title

Acronym
PEACOG

Study objectives
Please note that as of 25/04/2008 this record was extensively updated. All updates to this record can be found in the relevant field, under the update date of 25/04/2008. Please note that the anticipated start and end dates of this trial have also been updated. The previous start and end dates of this trial were:
Anticipated start date: 01/09/2006
Anticipated end date: 30/11/2009

Current hypothesis as of 25/04/2008:
In order that an accurate pulmonary endarterectomy (PEA) may be performed, good visibility of the pulmonary artery tree, by way of a dry (bloodless) operative field, is required by the surgeon. Two alternative techniques may be used to obtain a bloodless field; deep hypothermic circulatory arrest (DHCA) involves the draining of blood from the entire circulation into the cardiopulmonary bypass (CPB) reservoir for short periods of time and selective antegrade cerebral perfusion (SACP) maintains blood flow to the brain, but blood flow to the lungs is reduced allowing adequate vision for dissection.

Null Hypothesis:
The two methods of obtaining a bloodless field for performing PEA are:
1. Equivalent in maintaining brain function, and
2. Equivalent in their surgical success, i.e. improvement in lung function

Alternative hypothesis: Studies by Ergin et. al. in 1994 and 1999, where 19% and 28% of patients, respectively, undergoing DHCA showed temporary neuropsychological dysfunction. In comparison, Eusanio et. al. in 2002 showed a dysfunction in 5.1% of patients undergoing SACP. We therefore hypothesise that although surgical success will not differ between the two techniques, SACP will be superior to DHCA in maintaining (or improving) pre-operative brain function.

Previous hypothesis:
To determine whether maintaining blood flow around the brain during pulmonary endarterectomy (PEA), as opposed to total circulatory arrest, improves three-month post-operative brain function.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Added 25/04/2008:
Ethics approval received from the Peterborough and Fenland Local Research Ethics Committee (now known as Cambridgeshire 3 Research Ethics Committee) on the 29 March 2006.

Primary study design

Interventional

Study design
Randomised controlled trial

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Endarterectomy

Interventions
Minor additions made to interventions on 25/04/2008 (noted in text):
We propose to perform a prospective, single centre, randomised study to include all patients referred to Papworth Hospital for PEA to determine the impact of DHCA versus SACP on brain function and surgical success. Patients will be randomly allocated into either DHCA or SACP groups.

Cognitive (or neuropsychological) testing will be used to assess subject brain function pre- and post-operatively (3 and 12 months). Cognitive testing aims to detect slight changes in intellectual function and personality, and has traditionally been done using 'pen and paper' tests. Consensus statements published in 1995 and 1997 recommend four tests (Rey auditory verbal learning test, Trail-making A and B, and the grooved pegboard) to be used as a minimum to enable comparisons to be made across different studies. Computerised tests may also be useful, as they are more user friendly for both test administrator and subject, and are less susceptible to human error. We therefore propose to administer the consensus battery of four conventional tests alongside a series of computerised tests (CAmbridge Neuropsychological Test Automated Battery [CANTAB]). The patient and member of the research team administering the cognitive function tests will be blind to the randomisation group. Scores for depression, anxiety and pain will be used to check for their effects on test results. The national adult reading test will also be administered to subjects in order to determine baseline intelligence quotient (IQ) levels. The total length of time spent by each subject on the cognitive testing will be 4.5 hours (1.5 hours at each of the pre-operative and follow-up visits).

Cognitive testing will be carried out in a dedicated quiet room (added as of 25/04/2008 - previously 'quiet area of the ward'), by the same test administrator on each occasion, without interruptions and allowing for rest breaks if required by the subject. Blood samples will be collected before the operation, and also at one time point post-operatively. These samples will be stored until an appropriate test for oxygen deprivation has been identified, up to a maximum of ten years (added as of 25/04/2008 - previously two years).

All patients return to Papworth Hospital for an inpatient stay of 2 - 4 days at 12 weeks and and a minimum of 1 day at 1 year post-operatively as part of their routine care (added as of 25/04 /2008 - previously there was no mention of 'minimum of 1 day'). Lung function testing, six-minute walk test, New York Heart Association (NYHA) scores and the Cambridge Pulmonary Hypertension Outcome Review (CAMPHOR) quality of life assessment (a disease specific questionnaire developed at Papworth Hospital) are routinely carried out during the 12 week and 1 year visits and this data will be collected. A right heart catheter is routinely performed at 12 weeks to measure changes in pulmonary artery pressures. These routine assessments will provide the measures of surgical success for our study. No additional clinical assessments will be carried out as part of the study.

Safety and recourse use data will also be collected for each participant, including all adverse events, details on the operative procedure, concomitant medications, and length of critical care and hospital stay.

Project timetable:
Months 0 - 2: trial literature will be produced and Ethics Committee approval will be sought
Months 3 - 32: recruitment of patients into the study. A total of 110 will be required. If 1 patient is recruited per week, for 48 weeks/year, recruitment will be complete in 27 months.
Months 6 - 44: follow-up period. Patients will be followed up for 1 year post-operatively.
Months 45 - 47: closedown period to ensure data complete and prepare final report.

Risks and inconvenience for participants:
There are no additional risks involved with completing the cognitive tests. However, the additional time necessary to complete the tests may be considered an inconvenience by some participants.

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Intervention Type
Procedure/Surgery

Phase
Not Specified

Primary outcome(s)
The proportion of patients demonstrating a decline in cognitive function, compared to baseline, 12 weeks after PEA in DHCA versus SACP groups. Cognitive function will be assessed using the consensus battery of conventional pen and paper tests.

Key secondary outcome(s)
Added as of 25/04/2008:
1. The number of patients with clinically significant cognitive function deficit at twelve weeks, defined as a drop in a patient's postoperative score of greater than or equal to 1 SD from their pre-operative score in two or more tests
2. Mean pulmonary artery pressure (mPAP) and pulmonary vascular resistance (PVR) at baseline and 12 weeks post-surgery
3. NYHA, CAMPHOR and six-minute walk test at baseline, 12 weeks, and 1 year
4. Cognitive function in patients 12 months after PEA assessed as detailed above
5. CANTAB system of computerised cognitive tests at baseline, 12 weeks and 1 year
6. Extubation time
7. Length of stay in the Intensive Care Unit and in hospital
8. Intra-operative cerebral oxygen saturation as measured by near infrared spectroscopy (NIRS)

Completion date
01/03/2010

Eligibility

Key inclusion criteria
Current inclusion criteria as of 25/04/2008:
1. Patients referred for PEA
2. Aged between 18 and 80, either sex
3. Written informed consent obtained

Previous inclusion criteria:
All patients referred to Papworth hospital for PEA

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Not Specified

Sex
Not Specified

Key exclusion criteria
Added 25/04/2008:
1. Anticipated difficulty with completion of cognitive function tests (e.g. sight or hearing impairments, physical barriers)
2. Not fluent in the English language
3. Unable to obtain informed consent
4. Patients having other concomitant surgery, e.g. coronary artery bypass grafting, valve surgery
5. Past medical history of stroke or psychiatric disorder
6. Repeat PEA
7. Patients having unacceptable risk as per investigator judgement or where a specific request for either DHCA or SACP has been made by the surgeon

Date of first enrolment
01/09/2006

Date of final enrolment
01/03/2010

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Department of Cardiothoracic Surgery
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Sponsor information

Organisation
Papworth Hospital NHS Foundation Trust (UK)

ROR
https://ror.org/01qbebb31

Funder(s)

Funder type
Government

Funder Name
Cambridge Consortium - Papworth Hospital NHS Trust (UK)

Funder Name
Papworth Hospital Own Account (UK) - Time only

Funder Name
NHS R & D Support Funding (UK)

Funder Name
Added as of 25/04/2008:

Funder Name
The Moulton Charitable Foundation (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?
Results article	results	15/10/2011		Yes	No