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Use of transthoracic echocardiography with agitated saline injection to detect transpulmonary shunting and Hepatopulmonary Syndrome in patients with advanced liver disease awaiting liver transplantation

Submission date	Recruitment status	[ ] Prospectively registered
30/09/2005	No longer recruiting	[ ] Protocol
Registration date	Overall study status	[ ] Statistical analysis plan
30/09/2005	Completed	[ ] Results
Last Edited	Condition category	[ ] Individual participant data
29/01/2015	Digestive System	[ ] Record updated in last year

Plain English summary of protocol
Not provided at time of registration

Contact information

Type(s)
Scientific

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Additional identifiers

EudraCT/CTIS number

IRAS number

ClinicalTrials.gov number

Secondary identifying numbers
N0265160812

Study information

Scientific Title
Use of transthoracic echocardiography with agitated saline injection to detect transpulmonary shunting and Hepatopulmonary Syndrome in patients with advanced liver disease awaiting liver transplantation

Study objectives
Please note that this trial was originally registered on the NRR under N0265150494, but this was intially abandoned. This trial has now been revised and re-entered into the NRR as N0265160812, and this trial record has been updated with this new information as of 19/09 /2007.

Current hypothesis as of 19/09/2007:
To determine if transthoracic echocardiography with the intravenous injection of agitated saline is a useful screening test for the detection of right to left shunting in patients with advances liver disease awaiting liver transplantation.

The hypothesis is that this method is more sensitive in detecting shunting than the current standard of measuring arterial oxygen levels from the radial artery and will enable us to estimate the prevalence of right to left shunting in this population without need for an invasive procedure. The detection of such shunting is important as it places considerable urgency on the need to proceed with transplantation due to an increased mortality in the present of hepatopulmonary syndrome (HPS).

1. To determine if different positioning of the patients (lying or sitting) affects the outcome of the test
2. To determine if those patients who have evidence of right to left shunting by echocardiography but who have normal arterial blood gas studies (and therefore are not currently defined as having HPS) are at increased risk of complications during liver transplantation
3. To determine the prevalence of sub-clinical left ventricular dysfunction diagnosed by strain and strain-rate echocardiography

Previous hypothesis:
To determine if transthoracic echocardiography with the intravenous injection of agitated sterile saline in the supine and sitting position is a useful screening test for detecting right to left pulmonary shunting in patients with advanced liver disease awaiting liver transplantation. The hypothesis is that this method is more sensitive in detecting right to left shunting than the current standard of measuring arterial oxygen levels from the radial artery, and will enable us to estimate the prevalence of right to left shunting in this population.

A - To determine if different positioning of the patients during the saline test (lying or sitting) affects the outcome of the test.
B - To determine if those patients who have evidence of right to left pulmonary shunting by echocardiography but who have normal arterial blood gas studies and therefore would not

currently be defined as having HepatoPulmonary Syndrome, are at increased risk of complications during liver transplantation.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Not provided at time of registration

Study design
Randomised controlled trial

Primary study design
Interventional

Secondary study design
Randomised controlled trial

Study setting(s)
Hospital

Study type(s)
Treatment

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

Health condition(s) or problem(s) studied
Digestive System: Liver disease

Interventions
Please note that the above start and end dates of this trial were amended on 19/09/2007 due to reasons stated in the hypothesis above. The previous dates were:
Anticipated start date: 26/10/2004
Anticipated end date: 26/10/2005

Current interventions as of 19/09/2007:
1. Prospective research participants will include all patients referred to the Liver Unit of the University Hospital, Birmingham NHS Trust over a one year period. The unit is one of only eight major referral centres for liver transplantation in the UK. As part of the assessment of transplantation, patients are admitted for one week to UHB during which arterial blood gas studies and routine echocardiogram is performed. At the time of admission on a Monday morning, all patients will be approached regarding participation in the study and will be given relevant information sheet on the research. To minimise disruption to clinical care, echocardiograms are performed on a Monday afternoon and patients will be asked at the start if they are willing to participate in the study. They will be given an opportunity to ask questions and to discuss the study with members of their family. If in agreement, they will be asked to sign a consent form
2. At completion of the routine pre-transplant echocardiogram, agitated saline injection will be performed under direct echocardiographic visualisation using standard and accepted protocols.

Two 10ml injections of agitated saline will be given intravenously, one with the patient in a sitting position and one with the patient lying down. The order will be randomised
3. Patients will continue with their routine investigations, including arterial blood sampling, and will not require further involvement in the study. Patient records will be examined to establish the outcome of any transplant
4. On completion of the study, all echocardiograms will be reviewed by an experienced observer blinded to the status of the patient and to the other of saline injection. The results will be analysed according to the presence or absence of shunting, the presence or absence of shunting in the sitting compared to the lying position, and the relative size of any shunt detected according to an accepted semi-quantitative method (small less than 6 bubbles; 6 - 20 bubbles moderate; greater than 20 bubbles large)
5. The design and details of the research have been discussed with senior members of the Liver Unit, including those directly involved in the pre-tranplant risk assessment of patients with suspected HPS and those involved in the anaesthetic care of such patients

Previous interventions:
1. The prospective research participants will include all patients referred to the Liver Transplantation Unit of the University Hospital Birmingham NHS Trust over a six month period. The unit is one of only eight major referral centres for liver transplantation for the United Kingdom, servicing. As part of the assessment for transplantation, patients are admitted to the hospital for one week, during which arterial blood gas studies and a routine transthoracic echo are performed
2. At the time of admission on a Monday morning, all patients will be approached regarding participation in the study and given relevant information sheets regarding the study. To minimise disruption to clinical care, echocardiograms are performed on the Monday afternoon, and patients will be asked at the start of the echocardiogram if they are willing to participate in the study. They will be given the opportunity to ask questions and to have discussed the study with family members. They will then be asked if they are prepared to sign the consent form
3. If consent is given, then at the completion of the routine echocardiogram, two 10ml injections (9mls of agitated saline + 1ml of patient's blood) will be given intravenously. The saline injections will be performed by an experienced echocardiographer (RS) and recorded on videotape. Saline injections will be performed in the lying and sitting positions, and the order of the injection order will be randomised so as to minimise reporting bias. Patients will then continue with their routine investigations including arterial blood gas analysis, and will not require any further assessment as part of the study
4. At the completion of the study period, all echocardiograms and saline studies will be reviewed by an experienced echocardiographer (RS) who will be blinded to the saline injection order. The degree of right to left shunting in lying and sitting positions will be graded semi-objectively according to previously used criteria - small shunt less than 6 bubbles in the left heart, moderate shunt 6 - 20 bubbles, large shunt greater than 20 bubbles

Intervention Type
Other

Phase
Not Specified

Primary outcome measure

1. To assess the prevalence of right to left transpulmonary shunting in patients with advanced liver disease awaiting liver transplantation using transthoracic echo with agitated saline
2. Is there a difference in the prevalence of right to left shunting detected by transthoracic echo with agitated saline in supine and sitting positions

Secondary outcome measures
Not provided at time of registration.

Overall study start date
09/08/2005

Completion date
09/08/2008

Eligibility

Key inclusion criteria
Current inclusion criteria as of 19/09/2007:
1. Potential research participants will be identified prospectively from all those admitted electively for transplant assessment to the University Hospital Birmingham over a one year period
2. They will be approached on the morning of admission to hospital. They will be given a patient information leaflet and have an opportunity to ask questions. Consent will not be taken at this time
3. Echocardiograms for pre-transplant assessment are performed on a Monday afternoon. Before the start of the test potential research participants will be approached and given an opportunity to ask further questions. At their satisfaction, they will be asked to sign a consent form if willing to participate
4. Patients electively admitted to UHB Liver Unit for assessment as to suitability for liver transplantation

Previous inclusion criteria:
Potential research participants will be all patients electively admitted to the Liver Transplantation Programme of the University Hospital Birmingham over a 6 month period from 01/10/2004 for pretransplant assessment. Prospective participants will be identified by review of elective admission lists, and will be approached by one of the investigators (RS) on the morning of admission to hospital. At this time they will be given the relevant information sheet and have an opportunity to ask questions. Consent will not be taken at this time.

The echocardiograms are performed later that day, and before the test patients will again have the opportunity to ask questions. The consent form will then be signed at this time if the patient is willing to participate.

Participant type(s)
Patient

Age group
Not Specified

Sex

Not Specified

Target number of participants
Not provided at time of registration.

Key exclusion criteria
Not provided at time of registration.

Date of first enrolment
09/08/2005

Date of final enrolment
09/08/2008

Locations

Countries of recruitment
England

United Kingdom

Study participating centre
Selly Oak Hospital
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Sponsor information

Organisation
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Sponsor type
Government

Website

http://www.dh.gov.uk/Home/fs/en

Funder(s)

Funder type
Government

Funder Name
University Hospital Birmingham NHS Trust (UK)

Funder Name
NHS R&D Support Funding

Results and Publications

Publication and dissemination plan
Not provided at time of registration

Intention to publish date

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not provided at time of registration