

# Optimising the cardiovascular system following liver transplantation surgery

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<b>Registration date</b> 04/04/2016	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 19/05/2023	<b>Condition category</b> Digestive System	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

Cirrhosis is a serious complication of liver disease, which involves widespread scarring of the liver. The damage to the liver caused by cirrhosis means that eventually the liver is unable to fulfil its normal functions, ultimately leading to liver failure. Cirrhosis develops gradually, however the damage to the liver is irreversible, and gets worse over time. When cirrhosis is so advanced that the liver is unable to function, a liver transplant is the only treatment option. Liver transplantation is currently the mainstay of treatment for liver failure and more than 800 liver transplants are performed each year in UK. Although a lifesaving treatment, liver transplantation is linked with a high risk of postoperative complications, and nearly two thirds of patients develop serious complications such as failure of the heart and lungs, loss of kidney function, infection, blood clots, or bleeding. Complications such as these can increase a patient's length of hospital stay, decrease their quality and length of life and result in failure of the transplanted organ, or even death. Following other types of major surgery goal directed fluid therapy (GDFT) is used in order to determine the amount of intravenous (through a drip) fluid needed by the patient. GDFT has been shown to markedly reduce the occurrence of postoperative complications. It is not known whether this method of treating patients is beneficial or harmful following liver transplantation because the fact that these patients have liver cirrhosis means that their bodies process things differently. The aim of this study is to assess the practicability and safety of GDFT following liver transplantation.

### Who can participate?

Adults with liver cirrhosis who have been selected to have a liver transplant

### What does the study involve?

Participants are randomly allocated to one of two groups. Participants in the first group receive GDFT for 12 hours after their transplant surgery. This involves using a device to measure the volume of blood ejected by the heart at each beat (stroke volume), which is used to determine whether IV fluid should be given to the patient, according to a commonly used method for surgical patients. Participants in the second group are treated using the standard current management of IV fluids (drips) for the first 12 hours after surgery. Participants in both groups

are followed up after six months to find out if the new liver is working properly and there have been any complications after the transplant, as well as their quality of life and length of stay in hospital after the surgery.

What are the possible benefits and risks of participating?

There are no direct benefits for participants taking part in this study. In most studies, goal directed fluid therapy has been shown to be of benefit to patients undergoing surgery. Goal directed fluid therapy has never been evaluated in patients following liver transplantation, and we shall closely assess its safety in this setting. There are no notable risks involved with participating in this study.

Where is the study run from?

Royal Free Hospital (UK)

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

May 2014 to October 2018

Who is funding the study?

National Institute for Health Research (UK)

Who is the main contact?

Dr Daniel Martin

## Contact information

**Type(s)**

Scientific

**Contact name**

Dr Daniel Martin

**ORCID ID**

<https://orcid.org/0000-0001-6220-8235>

**Contact details**

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## Additional identifiers

**Protocol serial number**

N/A

## Study information

**Scientific Title**

A feasibility study of Cardiac Output optimisation following Liver Transplantation (COLT trial)

**Acronym**

COLT

**Study objectives**

Managing IV fluid requirements using a cardiac output monitor according to a GDFT protocol following transplantation for liver cirrhosis will be both feasible and safe. In addition, surgical outcomes can be improved in this patient group through the use of GDFT, however, the feasibility of this approach must be thoroughly explored prior to a definitive large-scale trial.

**Ethics approval required**

Old ethics approval format

**Ethics approval(s)**

Bloomsbury Research Ethics Committee, 05/01/2016

**Study design**

Single-centre randomised controlled feasibility trial

**Primary study design**

Interventional

**Study type(s)**

Prevention

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

Liver transplantation for liver cirrhosis

**Interventions**

Participants immediately post liver transplant will be randomised on admission to the intensive care unit to one of two treatment groups for the first 12 hours.

Intervention group: Participants undergo goal directed fluid therapy (GDFT) for 12 hours post-operatively. This involves the use of a FloTrac cardiac output monitor (EV1000 Clinical Platform, Edwards Lifesciences, Irvine, USA) to measure stroke volume, which will be used to determine IV fluid administration. The Edwards EV1000 cardiac output monitor is a non-invasive pulse wave contour analysis device that calculates cardiac output and stroke volume. Electronic information from the indwelling arterial catheter that all of these patients have inserted as part of their routine treatment is sent to the EV1000 to calculate cardiac output and stroke volume.

Control group: Participants are treated using the standard current management of IV fluids for 12 hours post-operatively.

Participants in both study arms are followed up after six months

**Intervention Type**

Device

**Phase**

Not Applicable

**Drug/device/biological/vaccine name(s)**

FloTrac cardiac output monitor (EV1000 Clinical Platform, Edwards Lifesciences, Irvine, USA)

**Primary outcome(s)**

Feasibility is determined at the end of the study period as the:

1. Ability to recruit patients at the site: A recruitment rate of greater than 40% of patients fulfilling the criteria for this study will be deemed as successful
2. Rate of withdrawal from GDFT protocol: A withdrawal rate of less than 10% will be deemed as successful
3. Reasons for withdrawal from GDFT protocol: Qualitatively assessed
4. Ability to adhere to the GDFT protocol for the 12 hour intervention period: Less than 10% of patients with a deviation from the protocol will indicate success

**Key secondary outcome(s)**

1. Quality of life is measured using Eq5D pre-transplant, 3 and 6 months
2. Postoperative complications are measured using the Clavien-Dindo Classification of surgical complications at 6 months
3. Hospital length of stay is measured using hospital computer system in days
4. ICU length of stay is measured using using hospital computer system in days
5. Graft (liver) function and survival is measured at 6 months by monitoring postoperative complications specifically related to liver transplantation surgery, occurring within 180 days of liver transplantation, defined as any of the following:
  - 5.1. Two or more episodes of graft rejection (biopsy proven and treated)
  - 5.2. Vascular thrombotic episodes
  - 5.3. Bleeding requiring intervention
  - 5.4. Acute kidney injury requiring renal replacement therapy
  - 5.5. Biliary leak requiring intervention
  - 5.6. Biliary stricture requiring intervention
  - 5.7. Cytomegalovirus, fungal or bacterial infection at any site confirmed by culture
6. Patient survival is measured using hospital information system at 6 months

**Completion date**

01/10/2018

**Eligibility****Key inclusion criteria**

1. Aged between 18 and 80 years
2. Liver cirrhosis
3. Selected to undergo liver transplantation
4. Competent to give consent

**Participant type(s)**

Patient

**Healthy volunteers allowed**

No

**Age group**

Adult

**Lower age limit**

18 years

**Sex**

All

**Total final enrolment**

60

**Key exclusion criteria**

1. Non-cirrhotic liver disease
2. Pregnancy
3. Age less than 18 years or over 80 years
4. Body weight less than 40 kg
5. Re-transplantation for primary graft non-function
6. Fulminant hepatic failure
7. Emergency surgery
8. Known learning disabilities or previously lacking capacity to consent for themselves
9. Prisoners
10. Patients already enrolled in an interventional study
11. Refusal or inability to consent

**Date of first enrolment**

01/04/2016

**Date of final enrolment**

31/08/2017

**Locations****Countries of recruitment**

United Kingdom

England

**Study participating centre****Royal Free Hospital**

Royal Free London NHS Foundation Trust

Pond Street

Hampstead

London

United Kingdom

NW3 2QG

**Sponsor information**

## Organisation

University College London

## ROR

<https://ror.org/02jx3x895>

## Funder(s)

### Funder type

Government

### Funder Name

National Institute for Health Research

### Alternative Name(s)

National Institute for Health Research, NIHR Research, NIHRresearch, NIHR - National Institute for Health Research, NIHR (The National Institute for Health and Care Research), NIHR

### Funding Body Type

Government organisation

### Funding Body Subtype

National government

### Location

United Kingdom

## Results and Publications

### Individual participant data (IPD) sharing plan

#### IPD sharing plan summary

Not expected to be made available

#### Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>	results	01/08/2020	16/07/2020	Yes	No
<a href="#">Protocol article</a>	protocol	07/03/2018		Yes	No
<a href="#">Abstract results</a>		01/12/2018	19/05/2023	No	No
<a href="#">Participant information sheet</a>	version V2	13/04/2016	02/06/2016	No	Yes