# A trial to investigate whether giving albumin to patients with advanced liver cirrhosis will reverse immune suppression and improve outcome for infection

Submission date	Recruitment status No longer recruiting	[X] Prospectively registered		
18/03/2015		[X] Protocol		
Registration date	Overall study status	Statistical analysis plan		
20/03/2015	Completed	[X] Results		
Last Edited	Condition category	[] Individual participant data		
25/11/2021	Digestive System			

# Plain English summary of protocol

Background and study aims

Liver disease is the fifth most common cause of death in the UK and is caused largely by alcohol, viruses and fatty liver disease resulting in liver damage and loss of function. People can survive with large amounts of liver damage but often have severe health complications leading to frequent hospital admissions. In particular, patents have weak immune systems and are highly prone to bacterial infection with over a third developing an infection in hospital. Infection is the major cause of death in these patients and therefore represents a huge challenge to the NHS. Currently infection in liver patients is treated with antibiotics, however the rates of death in these patients have shown little improvement over 20 years. Antibiotics may also cause harmful side-effects (e.g. diarrhoea) and overuse has led to antibiotic resistant bacteria which makes these drugs useless and will be one of medicines' greatest challenges over the next decade. Albumin is a protein found naturally in blood and is made in the liver. As liver function reduces so does albumin production and blood levels fall. Albumin is safe and currently used in patients with liver failure; however, prescription is varied and although considered beneficial the effects haven't been tested in clinical trials. Our study aims to see if giving liver patients Human Albumin Solution (HAS) restores their immune response and helps both prevent and improve treatment of infections.

# Who can participate?

Aults (aged over 18) admitted to hospital with acute or worsening complications of cirrhosis of the liver.

# What does the study involve?

This study includes a feasibility study, to verify whether it is possible to restore albumin levels to near normal. This is followed by a randomised control trial to confirm whether restoring albumin levels improves survival from infection compared to standard treatment. For the feasibility study, all participants are given 20% HAS during their hospital stay up to a maximum of 14 days. The dose given is dependent on how much albumin is found in the participants blood. For the

randomized controlled trial, participants are randomly allocated into one of two groups. Those in group 1 are given the immune restorative albumin protocol 20% HAS (dose dependent on blood albumin levels) during their hospital stay up to a maximum of 14 days. Those in group 2 are given standard medical care.

What are the possible benefits and risks of participating? Not provided at time of registration

Where is the study run from?

The study will take place at up to 44 NHS sites in England, Wales and Scotland.

When is the study starting and how long is it expected to run for? April 2015 to October 2017

Who is funding the study?

The National Institute for Health Research (NIHR) and the Wellcome Trust (both UK)

Who is the main contact?

James Blackstone, j.blackstone@ucl.ac.uk

# Contact information

# Type(s)

Scientific

#### Contact name

Mr James Blackstone

#### **ORCID ID**

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# Additional identifiers

Clinical Trials Information System (CTIS)

2014-002300-24

Protocol serial number

18450

# Study information

#### Scientific Title

Albumin To prevenT Infection in chronic liveR failurE

# Acronym

**ATTIRE** 

# **Study objectives**

- 1. Increased circulating concentrations of Cyclooxygenase (COX)-derived eicosanoid prostaglandin E2 (PGE2) drives cirrhosis-associated leukocyte dysfunction and hence the propensity to infection observed in these patients.
- 2. Infection triggers an acute clinical deterioration with progression of liver failure, development of liver-related complications, organ failure and mortality in patients with cirrhosis.
- 3. Albumin reduces PGE2 bioavailability and plays a key role in modulating PGE2-mediated immune dysfunction. As it is synthesised in the liver, circulating albumin levels are approximately 50% lower than in patients without advanced liver disease.
- 4. Therefore in vivo administration of 20% HAS to these patients will improve their leukocyte function thus enhancing their ability to combat infection, reducing the incidence of second /nosocomial infection. This will lead to fewer cases of organ failure and improved mortality.

# Ethics approval required

Old ethics approval format

# Ethics approval(s)

NRES Committee London-Brent, 26/01/15/LO/0104; First MREC approval date 26/01/2015

# Study design

Both; Interventional; Design type: Prevention, Treatment

# Primary study design

Interventional

# Study type(s)

Treatment

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

Liver cirrhosis

#### **Interventions**

Feasibility Study:

In stage 1, a Phase II feasibility study, all patients will receive a daily intravenous infusion of 20% Human Albumin Solution (HAS) during of their admission (maximum of 14 days from randomisation). The dose will be administered to target a daily serum albumin of 35 g/l. The following suggested protocol will be provided for clinicians:

- 1. If serum albumin 30-34 g/l give 100 ml 20% HAS
- 2. If serum albumin 26-29 g/l, give 200 ml 20% HAS
- 3. If serum albumin 20-25 g/l, give 300 ml 20% HAS
- 4. If serum albumin <20 g/l, give 400 ml 20% HAS

# Randomised Control Trial (RCT):

In stage 2, a phase III RCT, patients will receive a daily intravenous infusion of either the immune

restorative albumin protocol 20% HAS (dose based on the same suggested protocol as the feasibility study) or standard medical care for the duration of their admission (maximum of 14 days from trial randomisation).

# Intervention Type

Biological/Vaccine

#### Phase

Phase II/III

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

20% Human Albumin Solution

# Primary outcome(s)

Current primary outcome measures as of 14/09/2020:

Feasibility Study:

1. Daily serum albumin level for the duration of trial treatment period (maximum 14 days or discharge/death (if less than 14 days)

Patients will not be followed up after trial treatment.

#### RCT:

Composite outcome of incidences of

- 1. Nosocomial infection
- 2. Renal dysfunction
- 3. Mortality

As measured during the trial treatment period (maximum 14 days or discharge/death (if less than 14 days)

Patients in the RCT will be followed up for up to 6 months following discharge from hospital.

Previous primary outcome measures:

Feasibility Study:

1. Daily serum albumin level for the duration of trial treatment period (maximum 14 days or discharge/death (if less than 14 days)

Patients will not be followed up after trial treatment.

#### RCT:

Composite outcome of incidences of

- 1. Nosocomial infection
- 2. Extra hepatic organ dysfunction
- 3. Mortality

As measured during the trial treatment period (maximum 14 days or discharge/death (if less than 14 days)

Patients in the RCT will be followed up for up to 6 months following discharge from hospital.

# Key secondary outcome(s))

Feasibility Study:

1. Daily leukocyte function assessed by laboratory based leukocyte bioassay

#### RCT:

- 2. Mortality at 28 days post randomisation and 3 & 6 months post discharge
- 3. Time to outcome (first event of infection/organ dysfunction/death)
- 4. Transplant within six months of treatment
- 5. Total amount of HAS administered during treatment period
- 6. Duration of hospital stay
- 7. Prognostic score (assessed by UKELD, MELD, Child's Pugh scores) at baseline and end of treatment
- 8. Worst daily NEWS score during the treatment period
- 9. Incidence of SIRS during treatment period
- 10. Incidence of Septic Shock during treatment period
- 11. Days in ICU during treatment period
- 12. Incremental cost and cost-effectiveness up to 6 months post discharge
- 13. Impact on quality of life (QOL) up to 6 months post discharge
- 14. Safety and tolerability of HAS as indicated by Serious Adverse Events (SAEs)
- 15. Requirement for nutritional support (nasogastric feed, nutritional supplements or total parenteral nutrition) during treatment period

# Completion date

31/12/2019

# Eligibility

# Key inclusion criteria

- 1. All patients admitted to hospital with acute onset or worsening of complications of cirrhosis e. g. alcoholic hepatitis, hepatic encephalopathy, ascites, hepatic hydrothorax, hyperbilirubinaemia, oesophageal variceal bleed, any infection precipitating acute decompensation or any other presentation of acute decompensation / acute onset chronic liver failure
- 2. Over 18 years of age
- 3. Predicted hospital admission > 5 days at trial enrolment, which must be within 72 hours of admission
- 4. Serum albumin <30g/l at screening
- 5. Documented informed consent to participate (or consent given by a legal representative)

# Participant type(s)

Patient

# Healthy volunteers allowed

No

# Age group

Adult

# Lower age limit

18 years

#### Sex

All

# Total final enrolment

# Key exclusion criteria

- 1. Advanced hepatocellular carcinoma with life expectancy of less than 8 weeks
- 2. Patients who will receive palliative treatment only during their hospital admission
- 3. Pregnancy
- 4. Known or suspected severe cardiac dysfunction
- 5. Any clinical condition which the investigator considers would make the patient unsuitable for the trial
- 6. The patient has been involved in a clinical trial of Investigational Medicinal Products (IMPs) within the previous 30 days (including re-randomisation into the RCT)
- 7. Trial investigator unable to identify the patient (by NHS number)

# Date of first enrolment

30/04/2015

### Date of final enrolment

30/06/2019

# Locations

#### Countries of recruitment

United Kingdom

England

# Study participating centre University College London

Gower Street London United Kingdom WC1E 6BT

# Sponsor information

#### Organisation

University College London (UK)

#### **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

## **Funder Name**

Wellcome Trust

# Alternative Name(s)

# **Funding Body Type**

Private sector organisation

# **Funding Body Subtype**

International organizations

#### Location

United Kingdom

# **Results and Publications**

# Individual participant data (IPD) sharing plan

Not provided at time of registration

# 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	feasibility study results	01/05/2018 15/11/2019 Yes No
Results article	feasibility study results	01/05/2018 15/11/2019 Yes No

Results article	results	04/03/2021	05/03/2021 Ye	s No
Results article		01/11/2021	25/11/2021 Ye	s No
<u>Protocol article</u>	protocol	25/01/2016	Ye	s No
<u>Protocol article</u>	protocol	21/10/2018	Ye	s No
HRA research summary			28/06/2023 No	No No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025 No	Yes