

A study of the benefit of a medicine called eculizumab in Shiga-Toxin producing E. Coli Haemolytic Syndrome

Submission date 15/12/2016	Recruitment status No longer recruiting	☒ Prospectively registered ☐ Protocol
Registration date 15/12/2016	Overall study status Completed	☐ Statistical analysis plan ☒ Results
Last Edited 14/03/2022	Condition category Infections and Infestations	☐ Individual participant data

Plain English summary of protocol

Background and study aims

Shiga-toxin producing E. coli Haemolytic Uraemic Syndrome (STEC HUS) follows a gut infection with Shiga-toxin producing E. coli (STEC), which causes severe (often bloody) diarrhoea. Around 1000 UK children are infected with STEC each year and approximately 100 of these develop STEC HUS when a toxin from STEC causes damage to small blood vessels, especially in the kidneys. About 50-60% of children with STEC HUS need artificial kidney support (dialysis), which may last several weeks. About 2-3% of children with STEC HUS die, and about 20-25% get HUS in their brain, causing fits or a stroke. Many make a full recovery, but about 25-30% will have permanent kidney damage or more rarely brain damage. Previous studies have investigated a number of different treatments for STEC HUS, but have failed to show significant benefit. Eculizumab is a medicine that blocks part of the immune system called complement. Evidence suggests complement plays a role in STEC HUS. Eculizumab is very effective in a related condition called atypical HUS. Some doctors have given it to children with severe STEC HUS and seen a very good recovery, but this may have been just chance because others have tried it and didn't see much effect. The aim of this study is to investigate the benefit of eculizumab in patients with STEC HUS.

Who can participate?

Children aged between 6 months and 19 years old with STEC HUS who have had diarrhoea within the two weeks before they were diagnosed.

What does the study involve?

Participants are randomly allocated to one of two groups. Those in the first group are treated with eculizumab and those in the second group are treated with placebo (inactive medicine) soon after arriving at the unit and a second dose of the same medicine a week later. Before starting treatment, children in both groups are given a meningococcal vaccination (meningitis vaccine). All participants are followed-up for 12 months from randomisation, with daily trial assessments until hospital discharge, then at 30 and 60 days and 6 and 12 months. This is in keeping with the normal frequency of follow up in clinical practice.

What are the possible benefits and risks of participating?

Participants may benefit from a reduction in both the acute (sudden) severity of STEC HUS, and in long term complications. The main risk for study participants is a short term, small increase in the risk of meningococcal disease. This risk will be reduced by the use of vaccination and antibiotics.

Where is the study run from?

Birmingham Clinical Trials Unit (UK)

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

April 2009 to February 2021

Who is funding the study?

National institute for Health Research (UK)

Who is the main contact?

Dr Raquel Fernández del Río
ecustec@trials.bham.ac.uk

Contact information

Type(s)

Public

Contact name

Mr Hugh Jarrett

Contact details

Birmingham Clinical Trials Unit
Institute of Applied Health Research
College of Medical and Dental Sciences
Public Health Building
University of Birmingham
Edgbaston
Birmingham
United Kingdom
B15 2TT
+44 121 415 9132
H.Jarrett@bham.ac.uk

Type(s)

Public

Contact name

Dr Raquel Fernández del Río

Contact details

Birmingham Clinical Trials Unit (BCTU)
Institute of Applied Health Research
College of Medical and Dental Sciences
Public Health Building

University of Birmingham
Edgbaston
Birmingham
United Kingdom
B15 2TT
-
ecustec@trials.bham.ac.uk

Additional identifiers

Clinical Trials Information System (CTIS)
2016-000997-39

Protocol serial number
32199

Study information

Scientific Title
Eculizumab in Shiga-Toxin producing E. Coli Haemolytic Uraemic Syndrome (ECUSTEC): a randomised, double-blind, placebo-controlled trial

Acronym
ECUSTEC

Study objectives
The aim of this study is to determine if the severity of Shiga-Toxin producing E. Coli Haemolytic Uraemic Syndrome (STEC HUS) is less in those given Eculizumab (Ecu) versus those given placebo therapy.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Not provided at time of registration

Primary study design
Interventional

Study design
Randomised; Interventional; Design type: Treatment, Drug, Immunotherapy

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Shiga-toxin producing Escherichia coli Haemolytic Uraemic Syndrome (STEC HUS)

Interventions

Prior to entering the trial, all potential patients will commence an 8 week course of antibiotics (either phenoxymethylpenicillin or erythromycin if allergic to penicillin). Once they have been entered into the trial, but before receiving their randomised treatment, all participants will be given meningococcal vaccinations. Following this, participants will receive two doses of their study treatment; one dose soon after arriving at the children's kidney unit (day 1), and a second dose of the same medicine a week later (day 8).

Participants will be randomised to either of the following trial arms:

Active arm: Standard therapy + 1st dose eculizumab on day 1 and 2nd dose eculizumab on day 8

Control arm: Standard therapy + 1st dose placebo on day 1 and 2nd dose placebo on day 8

All participants will be followed-up for 12 months from randomisation, with daily trial assessments until hospital discharge, then at 30 and 60 days and 6 and 12 months post randomisation. This is in keeping with the normal frequency of follow up in clinical practice.

Intervention Type

Drug

Phase

Phase II

Drug/device/biological/vaccine name(s)

Eculizumab

Primary outcome(s)

Severity of acute kidney injury and extra-renal events is assessed using the purpose-developed STEC HUS clinical severity score at day 60.

Key secondary outcome(s)

1. Overall survival is measured by survival status at 52 weeks
2. Duration of dialysis, measured by the number of days on dialysis over 52 weeks
3. Duration of thrombocytopenia, measured by the number of consecutive days until platelet count $>150 \times 10^9/l$ up until 52 weeks. Participants enter the trial with a platelet count $<150 \times 10^9$ and this is measured daily up until discharge or 28 days (whichever is soonest) then at 30 days, 60 days, 26 weeks and 52 weeks
4. Duration of haemolysis, measured by the number of days until lactate dehydrogenase is within normal reference range up until 52 weeks this is measured daily up until discharge or 28 days (whichever is soonest) then at 30 days, 60 days, 26 weeks and 52 weeks
5. Number of packed red blood cell transfusions required, measured by volume (ml/kg) over 52 weeks this data is collected at discharge, day 30, day 60, week 26 and week 52
6. Markers of inflammation, measured by the number of days until normal total white count and CRP over 52 weeks this is measured daily up until discharge or 28 days (whichever is soonest) then at 30 days, 60 days, 26 weeks and 52 weeks
7. Chronic Kidney Disease at 52 weeks which is measured by a composite endpoint of the presence of hypertension [average of 3 readings by manual method using centile charts* for age/sex/height], albuminuria [urine albumin-creatinine ratio $>2.5mg/mmol$ on early morning urine] or $eGFR < 90ml/min/1.73m^2$ at 52 weeks) collected at week 52 only
8. $eGFR$ measured using a centralised cystatin C assay at 52 weeks collected at baseline, discharge, day 30, day 60, week 26 and week 52

9. Persistent neurological defect rate, measured by a structured expert assessment to include CNS examination, vision, hearing and neuropsychological assessment measured at 60 days based on the CRFs we measure this at baseline, discharge, day 30 and day 60
10. Economic evaluation of cost per clinical severity score point measured at day 60, and cost per QALY gained, measured by PedsQL and CHU-9D assessments which are collected at baseline, day 8, day 30, day 60, week 26 and week 52

Completion date

23/02/2021

Eligibility

Key inclusion criteria

1. Children aged 6 months to <19 years
2. Weight of $\geq 5\text{kg}$
3. A diagnosis of HUS:
 - 3.1. Micro-angiopathic haemolytic anaemia (indicated by fragmented red cells on blood film or plasma lactate dehydrogenase above local centre reference range)
 - 3.2. AND Thrombocytopenia (platelets $<150 \times 10^9/\text{l}$)
 - 3.3. AND AKI of "injury" or "failure" category of pRIFLE criteria (despite correction of hypovolaemia)
4. Reported diarrhoea within 14 days prior to diagnosis of HUS (defined according to World Health Organisation as "the passage of three or more loose or liquid stools per day - or more frequent passage than is normal for the individual")
OR
A stool culture/shiga toxin PCR/STEC result indicating STEC in the patient or household contact within 14 days prior to diagnosis of HUS.
Patient intended to be able to receive trial drug within 36 hours of arrival at renal unit, or within 24 hours of eligibility if already at renal unit
5. Patient intended to be able to receive trial drug within 36 hours of arrival at the renal unit, or within 24 hours of eligibility if already at renal unit
6. Sexually active male or female patients must agree to practice an effective, reliable and medically approved contraceptive regimen for 6 months after enrollment
7. Written informed consent obtained from the participant's parents/guardians and written assent obtained from participant (where age appropriate). Participants aged 16 years and above will provide their own written informed consent

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Child

Lower age limit

6 Months

Upper age limit

19 Years

Sex

All

Total final enrolment

36

Key exclusion criteria

1. Family history of atypical HUS (aHUS)
2. Previous episode of HUS
3. Known pre-existing eGFR < 90ml/min / 1.73m²
4. Known or suspected pneumococcal infection
5. Known or suspected meningococcal infection
6. Patient taking a drug known to be associated with HUS, e.g. calcineurin inhibitors, chemotherapy, quinine, oral contraceptive pill
7. Hypersensitivity to eculizumab, murine proteins or any of the excipients listed in the Summary of Product Characteristics
8. Pregnancy or lactation
9. Malignancy
10. Known Disseminated Intravascular Coagulopathy (testing of coagulation is not mandatory for inclusion in trial)
11. Refusal of consent, including consent for meningococcal vaccination or antibiotic prophylaxis
12. Currently participating in another CTIMP

Date of first enrolment

11/08/2017

Date of final enrolment

06/02/2021

Locations**Countries of recruitment**

United Kingdom

England

Study participating centre

Birmingham Clinical Trials Unit

The University of Birmingham

Edgbaston

Birmingham

United Kingdom

B15 2TT

Sponsor information

Organisation

The Newcastle upon Tyne Hospitals NHS Foundation Trust

ROR

<https://ror.org/05p40t847>

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**

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?
Basic results		25/11/2021	14/03/2022	No	No
Study website	Study website	11/11/2025	11/11/2025	No	Yes