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AmBeR UCD: can we measure ammonia in breath sample?

Submission date
30/10/2017

Recruitment status
No longer recruiting

Registration date
29/11/2017

Overall study status
Completed

Last Edited
17/11/2021

Condition category
Nutritional, Metabolic, Endocrine

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Current plain English summary as of 26/03/2019:
Background and study aims
Urea cycle disorders are a group of genetic metabolic conditions that prevents correct conversion of nitrogen to urea and, instead, produces ammonia. These patients cannot effectively control the level of ammonia in their blood. If the ammonia reaches high levels, this can cause severe illness and even death in these patients. This is a lifelong debilitating condition which is difficult to manage, as it is hard to tell when a patient is well or when they are sick. This study investigates whether a device (called the AmBeR device) for measuring ammonia in people' s breath relates to the concentration of ammonia in their blood. If successful, this device would allow a simple, painless way of monitoring these patients in their own home. As well as significantly improving their quality of life, this would also be a significant reduction in the burden on the healthcare system.

Who can participate?
This study involves children aged 5 years and younger who have a Urea Cycle Disorder or another hyper-ammonaemic condition as well as a parent or carer who is willing to help collect breath samples.

What does the study involve?
This study includes two parts: a clinic study and a home study. The clinic study asks participants to provide breath samples and to complete questionnaires on dietary intake and quality of life. The breath samples are collected using the AmBeR device. The home study involves participants collecting breath samples two-three times per day for three months using the AmBeR breath ammonia device. Patients or carers are asked to record the participants' health status, time of last food/drink and any issues they experience using the device. Participants are followed up after three months to measure their quality of life.

What are the possible benefits and risks of participating?
There are no significant benefits or risks in taking part in this study.

Where is the study run from?
1. Bristol Royal Hospital for Children (UK)

2. Great Ormond Street Hospital for Children NHS Foundation Trust (UK)
3. Evelina London Children's Hospital (UK)
4. Birmingham Children's Hospital (UK)

When is the study starting and how long is it expected to run for?
December 2016 to October 2019

Who is funding the study?
National Institute for Health Research (UK)

Who is the main contact?
Prof Julian Hamilton Shield
J.P.H.Shield@bristol.ac.uk

Previous plain English summary:
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Who is the main contact?
Prof Julian Hamilton Shield
J.P.H.Shield@bristol.ac.uk

Study website
N/A

Contact information

Type(s)
Public

Contact name
Prof Julian Hamilton-Shield

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+44 (0)1173420159
J.P.H.Shield@bristol.ac.uk

Additional identifiers

EudraCT/CTIS number

IRAS number

ClinicalTrials.gov number

Secondary identifying numbers
35123

Study information

Scientific Title
Assessment of a breath ammonia monitoring device for its potential to improve the management and care of patients with urea cycle disorders

Acronym
AmBeR UCD

Study objectives
The IMPRESS-Study evaluates a process-intervention on the basis of two comparing groups. This trial primarily aims to answer if mortality improves due to an organized collegial conference ("peer Review"). The aim is to find and eradicate error-potentials and improve in-house-quality.

Ethics approval required
Old ethics approval format

Ethics approval(s)
London – Riverside Research Ethics Service, 15/08/2017, ref: 17/LO/1077

Study design
Observational; Design type: Validation of outcome measures

Primary study design
Observational

Secondary study design
Cross sectional study

Study setting(s)
Hospital

Study type(s)
Treatment

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

Health condition(s) or problem(s) studied
Specialty: Children, Primary sub-specialty: Inherited Metabolic Disorders; UKCRC code/ Disease: Metabolic and Endocrine/ Metabolic disorders

Interventions
There are two parts to this research project: Clinic Study and Home Study.

Clinic Study: Once a participant has provided written consent and assent as appropriate, the participant is asked to provide breath samples and to complete two questionnaires, one which records dietary intake and the second records quality of life. Breath samples are collected using the using the AmBeR device to measure breath ammonia. Each measurement involves a set of exhalations (typically 8) into the mouthpiece of the AmBeR device; this is similar to natural breathing and does not involve a forced exhale in older children. However, in younger children, it may require a larger than normal inhale and exhale, the same as taking a deep breath. The AmBeR device measures how much ammonia is in the breath and this will be recorded by the device. Dietary intake is measured using a 24 hour recall online tool called Intake24 and quality of life is recorded using PedSQL.

Home Study: Patients are asked to collect 2-3 breath samples, two times per day, for three months using the AmBeR breath ammonia device at home. They are asked to provide these samples in the morning and in the evening. The patient/ carer are also asked to record patient health status information, time of last food/drink and any issues with the use of the device. There will be no change in the care model used during the home evaluation period and patients, carers and clinicians act independently of any data gathered by the instruments in a manner which continues to ensure optimum care of the patient during this study. During the three month period, parents/ carers are asked to record time off work data to cater to the child's health care needs, number and reason for hospital visits and contacts with primary care. Parents /carers are also be asked to complete a quality of life questionnaire (EQ-5D-5L) at baseline and at the three month follow up. Children are also be asked to complete a PedsQL Quality of life questionnaire at baseline and follow up. At the end of the three month period, the parent/carer will be asked if they would like to take part in a phone interview in which qualitative data will be recorded. This interview explore the parent/carer's user experiences of the AmBeR device.

Intervention Type
Device

Phase
Not Applicable

Primary outcome measure
Clinic Study:
Breath ammonia is measured using an ammonia breath monitor (AmBeR) at one occasion.

Home Study:
Breath ammonia is measured using an ammonia breath monitor (AmBeR) daily for a 3 month period.

Secondary outcome measures
There are no secondary outcome measures.

Overall study start date
16/12/2016

Completion date
31/10/2019

Eligibility

Key inclusion criteria
Clinic Study: Inclusion criteria for patients with Urea Cycle Disorder and other hyper-ammonaemic conditions
1. Aged ≥ 5 years
2. Diagnosis of a UCD or other hyper-ammonaemic condition
3. Capable of providing a valid breath sample
4. Providing a blood sample as part of their clinical care

Clinic Study: Inclusion criteria for control patients
1. Patients without a UCD or another hyper-ammonaemic condition attending for a routine inborn error of metabolism (IEM) hospital appointment and providing a blood sample as part of

their clinical care. An additional 1-2ml whole blood is required for the measurement of blood ammonia.
2. Aged ≥ 5 years
3. Capable of providing a valid breath sample

Home Study: Inclusion criteria (patients with Urea Cycle Disorder or other hyper-ammonaemic conditions)
1. Aged ≥ 5 years
2. Diagnosis of a UCD or other hyper-ammonaemic condition
3. Capable of providing valid breath samples
4. Family willing to help patient collect breath samples and record data

Participant type(s)
Patient

Age group
Adult

Sex
Both

Target number of participants
Planned Sample Size: 126; UK Sample Size: 126

Total final enrolment
94

Key exclusion criteria
Children under five years of age.

Date of first enrolment
10/11/2017

Date of final enrolment
28/02/2019

Locations

Countries of recruitment
England

United Kingdom

Study participating centre
Bristol Royal Hospital for Children
University Hospitals Bristol NHS Foundation Trust
Upper Maudlin Street

Bristol
United Kingdom
BS2 8BJ

Study participating centre
Great Ormond Street Hospital for Children NHS Foundation Trust
Great Ormond Street
London
United Kingdom
WC1N 3JH

Study participating centre
Evelina London Children’s Hospital
Guy's and St Thomas' NHS Foundation Trust
Westminster Bridge Road
St Thomas’ Hospital
London
United Kingdom
SE1 7EH

Study participating centre
Birmingham Children's Hospital
Birmingham Women’s and Children’s NHS Foundation Trust
Steelhouse Lane
Birmingham
United Kingdom
B4 6NH

Sponsor information

Organisation
University Hospitals Bristol NHS Foundation Trust

Sponsor details
Research & Innovation
Level 3, Education and Research Centre
Upper Maudlin Street
Bristol
England
United Kingdom
BS1 3NU

Sponsor type
Hospital/treatment centre

ROR
https://ror.org/04nm1cv11

Funder(s)

Funder type
Government

Funder Name
NIHR Central Commissioning Facility (CCF)

Results and Publications

Publication and dissemination plan
The trialists will disseminate their research findings at national and international conferences, invited talks, at relevant stakeholder groups including CLIMB, and via original research articles in high-end peer-reviewed journals.

Relevant conferences include:
1. British Inherited Metabolic Diseases Group Annual Conference
2. International Congress of Inborn Errors of Metabolism Annual conferences

Added 17/05/2021:
Several abstracts were accepted and the data presented at the following international conferences:
Society for Inherited Metabolic Disorders, Seattle, USA 2019:
1. Health-related quality of life in patients with hyperammonaemic disorders
2. Inherited errors of metabolism; are we succeeding in managing blood ammonia levels in patients with urea cycle disorders?
Society for the Study of Inborn Errors of Metabolism Annual Symposium, Rotterdam 2019:
1. Are we succeeding in managing blood ammonia levels in patients with urea cycle disorders?
2. Dietary intake of patients with hyperammonaemic disorders
3. Calculating health utilities from PedsQL quality of life scores for patients with hyperammonaemic disorders
4. Health-related quality of life in patients with hyperammonaemic disorders

Intention to publish date
31/10/2021

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?
Funder report results		30/10/2019	17/11/2021	No	No
HRA research summary			26/07/2023	No	No