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Magnesium sulphate for treatment of severe acute asthma

Submission date
23/02/2007

Recruitment status
No longer recruiting

Registration date
26/02/2007

Overall study status
Completed

Last Edited
17/05/2016

Condition category
Respiratory

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

Plain English Summary

Background and study aims
Asthma is a common long-term condition that can cause coughing, wheezing, chest tightness and breathlessness. An asthma attack is a sudden worsening of asthma symptoms. Magnesium sulphate can be used to treat patients with a severe asthma attack. It can be given intravenously through a drip into a vein in the patient's arm, or through a nebuliser, which produces a fine spray that is then inhaled. It is currently not clear how useful magnesium sulphate is in acute severe asthma or whether it is best given intravenously or by a nebuliser. We know that magnesium improves measurements of breathing ability, but it not clear whether this results in the patient feeling better or being able to avoid hospital admission. The aim of this study to find out whether intravenous or nebulised magnesium sulphate improves the symptoms of breathlessness in patients with a severe asthma attack and/or reduces the chances of needing hospital admission.

Who can participate?
Patients aged over 16 attending the emergency department with a severe asthma attack

What does the study involve?
Participants are randomly allocated to receive either standard treatment alone, standard treatment plus intravenous magnesium sulphate, or standard treatment plus nebulised magnesium sulphate. We ask all patients to assess their breathlessness over the following two hours and then follow them up for the next month to identify any health problems. By comparing the results from the three groups of patients we can establish which treatment produces the best results. We also measure health service costs and the amount of time patients take off work to determine whether treatment with magnesium sulphate is cost-effective.

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

Where is the study run from?
The University of Sheffield (UK)

When is the study starting and how long is it expected to run for?
September 2007 to September 2012

Who is funding the study?
Health Technology Assessment Programme (UK)

Who is the main contact?
Prof. Steve Goodacre
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Study website
http://www.shef.ac.uk/3mg

Contact information

Type(s)
Scientific

Contact name
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Additional identifiers

EudraCT/CTIS number

IRAS number

ClinicalTrials.gov number

Secondary identifying numbers
HTA 06/01/02

Study information

Scientific Title
Magnesium sulphate for treatment of severe acute asthma

Acronym
3Mg

Study hypothesis
We aim to measure the effectiveness and cost-effectiveness of intravenous (IV) and nebulised magnesium sulphate in acute severe asthma and thus determine whether either should be standard first-line treatment for patients presenting to the emergency department with acute severe asthma.

We plan to test the following specific hypotheses:
1. IV or nebulised magnesium sulphate will reduce the proportion of patients who require admission at initial presentation or during the following week
2. IV or nebulised magnesium sulphate will improve patients assessment of their breathlessness over two hours after initiation of treatment

More details can be found at: http://www.nets.nihr.ac.uk/projects/hta/060102
Protocol can be found at: http://www.nets.nihr.ac.uk/__data/assets/pdf_file/0019/51265/PRO-06-01-02.pdf

Ethics approval required
Old ethics approval format

Ethics approval(s)
Scotland A Research Ethics Committee, 08/06/2007

Study design
Multi-centre double-blind placebo-controlled three-arm randomised trial

Primary study design
Interventional

Secondary study design
Randomised controlled trial

Study setting(s)
Hospital

Study type(s)
Treatment

Participant information sheet
Patient information can be found at: http://www.shef.ac.uk/content/1/c6/07/17/87/pat_info%20v002%20May%2010%202007.doc

Condition
Acute severe asthma in adults

Interventions
Current interventions as of 30/04/2008:
This randomised trial will take place in up to 30 Emergency Departments in the United Kingdom.

Patients will be randomised to one of three treatment arms. Each treatment arm will receive one intravenous and one nebulised treatment. The intravenous infusions and nebuliser vials will each be prepared as apparently identical solutions to ensure blinding.

All three groups will also receive standard therapy, according to BTS/SIGN guidelines, with high flow oxygen and oral prednisolone. Other treatments will be given at the discretion of the attending clinician and recorded on the data collection form, although adherence to BTS/SIGN guidelines will be promoted.

Patients will be managed in the emergency department and data collected until two hours after randomisation. At this point, if not already undertaken, a final disposition decision will be made (hospital admission or discharge) and initial data collection completed.

Previous interventions:
Patients will be randomised to one of three treatment arms. Each treatment arm will receive one intravenous and one nebulised treatment. The intravenous infusions and nebuliser vials will each be prepared as apparently identical solutions to ensure blinding.

All three groups will also receive standard therapy, according to BTS/SIGN guidelines, with high flow oxygen and oral prednisolone. Other treatments will be given at the discretion of the attending clinician and recorded on the data collection form, although adherence to BTS/SIGN guidelines will be promoted.

Patients will be managed in the emergency department and data collected until two hours after randomisation. At this point, if not already undertaken, a final disposition decision will be made (hospital admission or discharge) and initial data collection completed.

Intervention Type
Drug

Phase
Not Applicable

Drug/device/biological/vaccine name(s)
Magnesium sulphate

Primary outcome measure
1. The health service primary outcome will be the proportion of patients who are admitted to hospital, either after emergency department treatment or at any time over the subsequent week.
2. The patient-centred primary outcome will be the patients visual analogue scale (VAS) for breathlessness over two hours after initiation of treatment.

Secondary outcome measures
1. Mortality
2. Adverse events
3. Use of ventilation or respiratory support
4. Length of hospital stay
5. Use of high dependency or intensive care
6. Change in PEFR and physiological variables (oxygen saturation, heart rate, respiratory rate) over two hours

7. Quality of life at baseline and one month (measured by EQ-5D)
8. Number of unscheduled health care contacts (emergency department, walk-in centre or general practitioner attendances) over the subsequent month
9. Satisfaction with care (measured by a modified Group Health Association of America survey)

Overall study start date
01/09/2007

Overall study end date
30/09/2012

Eligibility

Participant inclusion criteria
Current inclusion criteria as of 30/04/2008:
We will recruit adults (aged greater than 16 years) admitted to the Emergency Department with acute severe asthma as defined by the British Thoracic Society (BTS) and Scottish Intercollegiate Guideline Network (SIGN) guidelines, i.e. acute asthma with either peak expiratory flow rate (PEFR) less than 50% of best or predicted, respiratory rate greater than 25/min, heart rate greater than 110/min, or inability to complete sentences in one breath.

Eligible patients will be identified by medical staff and informed consent sought from the patient. Oral consent can be obtained initially, and written consent will be obtained before departure from the emergency department.

Consented participants will be randomised by telephone or internet using a system developed for the Sheffield Clinical Trials Research Unit (CTRU). A simple randomisation sequence will be used to allocate participants to numbered treatment packs kept in the emergency department. Each treatment pack will contain an intravenous infusion and a nebuliser solution, either of which could be active treatment or placebo. Participants, hospital staff and research staff will all be blind to allocated treatment.

Clinical staff will record baseline data, details of co-interventions and outcome data up to two hours after presentation. Further data will be collected at one month after recruitment by research nurses using routine data sources and by patient self-completion questionnaire.

Previous inclusion criteria:
We will recruit adults (age>16) admitted to the emergency department with acute severe asthma as defined by the British Thoracic Society (BTS) and Scottish Intercollegiate Guideline Network (SIGN) guidelines, i.e. acute asthma with either Peak Expiratory Flow Rate (PEFR) < 50% of best or predicted, respiratory rate > 25/min, heart rate > 110/min, or inability to complete sentences in one breath.

Eligible patients will be identified by medical staff and written, informed consent sought from either the patient, a personal legal representative or a professional legal representative (as outlined in Medicine for Human Use (Clinical Trials) Regulations 2004).

Consented participants will be randomised by telephone to the Sheffield Clinical Trials Support Unit (CTSU). A simple randomisation sequence will be used to allocate participants to numbered treatment packs kept in the emergency department. The CTSU will only reveal the allocated pack number after patient details have been recorded and the patient irreversibly entered into

the trial. Each treatment pack will contain an intravenous infusion and a nebuliser solution, either of which could be active treatment or placebo. Participants, hospital staff and research staff will all be blind to allocated treatment.

Clinical staff will record baseline data, details of co-interventions and outcome data up to two hours after presentation. Further data will be collected at one month after recruitment by research nurses using routine data sources and by patient self-completion questionnaire.

Participant type(s)
Patient

Age group
Adult

Sex
Both

Target number of participants
1200 between 3 trial arms (400 each)

Participant exclusion criteria
Current exclusion criteria as of 30/04/2008:
1. Patients with life threatening features (oxygen saturation less than 92%, silent chest, cyanosis, poor respiratory effort, bradycardia, arrhythmia, hypotension, exhaustion, coma or confusion)
2. Patients who are unable to provide oral or written informed consent
3. Patients with a contra-indication to either nebulised or intravenous magnesium sulphate: pregnancy, hepatic or renal failure, heart block or known hypermagnesaemia
4. Previous participants in the 3Mg Trial
Added 21/03/2011:
5. Patients who have received IV or nebulised magnesium sulphate in the previous 24 hours prior to admission to the emergency department.

Previous exclusion criteria:
1. Patients with life threatening features (oxygen saturation < 92%, silent chest, cyanosis, poor respiratory effort, bradycardia, arrhythmia, hypotension, exhaustion, coma or confusion)
2. Patients who are unable to provide written consent and for whom no personal or professional legal representative can be identified to act on their behalf
3. Patients with a contraindication to either nebulised or intravenous magnesium sulphate: pregnancy, hepatic or renal failure, heart block or known hypermagnesaemia
4. Previous participants in the 3Mg Trial

Recruitment start date
01/09/2007

Recruitment end date
30/09/2012

Locations

Countries of recruitment

England

United Kingdom

Study participating centre
The University of Sheffield
Sheffield
United Kingdom
S1 4DA

Sponsor information

Organisation
Sheffield Teaching Hospitals NHS Trust (UK)

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Sponsor type
Hospital/treatment centre

Website
http://www.sth.nhs.uk/

ROR
https://ror.org/018hjpz25

Funder(s)

Funder type
Government

Funder Name

Health Technology Assessment Programme

Alternative Name(s)
NIHR Health Technology Assessment Programme, HTA

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
United Kingdom

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

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/06/2013		Yes	No
Results article	results	01/04/2014		Yes	No