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Malignant Hyperpyrexia in Obstetric Practice

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In this guideline we use the term 'woman' throughout. This should be taken to include people who do not identify as women but are pregnant.

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1.0 Introduction

Malignant hyperpyrexia (MH) is an inherited autosomal dominant condition in which exposure to certain drugs used for general anaesthesia triggers a life-threatening reaction. The drugs responsible for the reaction are suxamethonium and all volatile anaesthetic agents.
In susceptible individual's administration of these drugs will induce a drastic and uncontrolled increase in skeletal muscle oxidative metabolism which overwhelms the body's capacity to supply oxygen, remove carbon dioxide, and regulate body temperature. This will lead to circulatory collapse and death if not treated.

2.0 Objective

To ensure the timely recognition and management of malignant hyperpyrexia in maternity practice.

3.0 Scope

This guideline applies to all medical and midwifery staff working on the maternity unit.

4.0 Main body of the document

Malignant hyperpyrexia is a life-threatening emergency that can occur during general anaesthesia in a susceptible patient. Unfortunately, previous uneventful anaesthesia does not rule out MH. The key to successful management is early recognition, getting appropriate help and administering Dantrolene.

4.1 Recognition

- Unexplained rise in end-tidal carbon dioxide **and** unexplained tachycardia **and** unexplained increase in oxygen requirements
- Temperature changes are often a late sign

4.2 Immediate management

- Stop all trigger agents
- Call for help (the anaesthetist will specify who they require – this could be the anaesthetic consultant on call or any other anaesthetist who is rapidly available)
- Remove vaporisers from the machine and give as high flows as possible
- Apply activated charcoal filters to the breathing circuit
- Maintain anaesthesia with an intravenous agent
- Inform surgeons of need to complete surgery as quickly as possible
- Ensure muscle relaxation with a non-depolarising muscle relaxant
- Give DANTROLENE
- (This is kept on top of the drug cabinet in the Birthing Centre theatre. If more is required it can be obtained from pharmacy or immediately from main theatres.)
- Initial dose = 2.5mg/kg immediately as iv bolus
- Repeat 1mg/kg boluses as required to a maximum of 10mg/kg
- Initiate active cooling measures whilst avoiding peripheral vasoconstriction (cold iv fluids, ice packs to groin and axillae, surgical wash out with cold saline)

- In addition to routine monitoring, monitor core and peripheral temperature, invasive blood pressure and central venous pressure
- Send bloods for arterial blood gas, urea and electrolytes, full blood count, clotting and plasma creatine kinase (CK). Repeat arterial blood gas every 30 minutes

4.3 Treat complications (this will continue into the post-operative phase)

- Hyperkalaemia – calcium chloride, glucose-insulin, sodium bicarbonate
- Arrhythmias – magnesium / amiodarone / metoprolol as appropriate but avoid calcium channel blockers as they interact with dantrolene
- Metabolic acidosis – hyperventilate and consider sodium bicarbonate
- Myoglobinaemia – forced alkaline diuresis
- Disseminated intravascular coagulopathy – give FFP, cryoprecipitate, and platelets as required. Liaise early with the Haematologist

4.4 Subsequent management

Post operatively the patient will need to be transferred to the Intensive Care Unit (ICU) for ongoing management.

- Arrange safe transfer with appropriate equipment and suitable staff following liaison with staff on ICU

The woman and her family will need ongoing follow up. Refer to the Malignant Hyperpyrexia unit at Leeds.

Address = The UK MH Investigation Unit, Academic Unit of Anaesthesia, Clinical Sciences building, Leeds Teaching Hospitals NHS Trust, Leeds, LS9 7TF

Direct Line   01132065270

Emergency hotline   07947609601

4.5 Roles and responsibilities

Midwives
To assist in the management of an anaesthetic emergency.

Obstetricians
To work in partnership with the anaesthetic team.

To ensure rapid safe delivery of the baby.

Paediatricians
To manage the resuscitation of the baby following delivery if required.

Anaesthetists
To co-ordinate and manage the anaesthetic emergency.

5.0 Associated documents and references

Association of Anaesthetists of Great Britain & Ireland AAGBI safety Guideline, Malignant Hyperthermia Crisis (20011)

British Malignant Hyperthermia Association (BMHA) About MH [online] http://www.bmha.co.uk/about%20mh.html accessed 17/04/2013

British Malignant Hyperthermia Association (BMHA) Anaesthesia for MH susceptible or suspected MH susceptible patients [online] http://www.bmha.co.uk/about%20mh.html accessed 17/04/2013

6.0 Training and resources

Training will be delivered as outlined in the Maternity Training Needs Analysis. This is updated on an annual basis.

7.0 Monitoring and audit

Any adverse incidents relating to the guideline for Management of malignant hyperpyrexia in obstetric practice will be monitored via the incident reporting system. Any problems will be actioned via the case review and root cause analysis action plans. The action plans are monitored by the risk midwife to ensure that improvements in care are made. The trends and any root cause analysis are discussed at the monthly risk meetings to ensure that appropriate action has been taken to maintain safety.

The guideline for Management of malignant hyperpyrexia in obstetric practice will be audited in line with the annual audit programme, as agreed by the CBU. The audit action plan will be reviewed at the monthly risk management meetings on a quarterly basis and monitored by the risk midwife to ensure that improvements in care are made.

8.0 Equality and Diversity

The Trust is committed to an environment that promotes equality and embraces diversity in its performance as an employer and service provider. It will adhere to legal and performance requirements and will mainstream equality, diversity and inclusion principles through its policies, procedures and processes. This guideline should be implemented with due regard to this commitment.

To ensure that the implementation of this guideline does not have an adverse impact in response to the requirements of the Equality Act 2010 this policy has been screened for relevance during the policy development process and a full equality impact assessment is conducted where necessary prior to consultation. The Trust will take remedial action when necessary to address any unexpected or unwarranted disparities and monitor practice to ensure that this policy is fairly implemented.

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This guideline can be made available in alternative formats on request including large print, Braille, moon, audio, and different languages. To arrange this please refer to the Trust translation and interpretation policy in the first instance.

The Trust will endeavor to make reasonable adjustments to accommodate any employee/patient with particular equality, diversity and inclusion requirements in implementing this guideline This may include accessibility of meeting/appointment venues, providing translation, arranging an interpreter to attend appointments/meetings, extending policy timeframes to enable translation to be undertaken, or assistance with formulating any written statements.

8.1 Recording and Monitoring of Equality & Diversity

The Trust understands the business case for equality, diversity and inclusion and will make sure that this is translated into practice. Accordingly, all guidelines will be monitored to ensure their effectiveness.

Monitoring information will be collated, analysed and published on an annual basis as part of Equality Delivery System. The monitoring will cover the nine protected characteristics and will meet statutory employment duties under the Equality Act 2010. Where adverse impact is identified through the monitoring process the Trust will investigate and take corrective action to mitigate and prevent any negative impact.

Appendix 1
Glossary of terms

ICU – Intensive Care Unit

CK – Creatine Kinase

FFP – Fresh Frozen Plasma

MH – Malignant Hyperpyrexia

Appendix 2
Maintain a record of the document history, reviews and key changes made (including versions and dates)

Version	Date	Comments	Author
1	03/06/2013		
2	17/05/2024		

Review Process Prior to Ratification:

Name of Group/Department/Committee	Date
Reviewed at Women's Business and Governance meeting	17/05/2024
Approved by CBU 3 Business and Governance meeting	28/06/2024

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Trust Approved Documents (policies, clinical guidelines and procedures)

Approval Form

Please complete the following information and attach to your document when submitting a policy, clinical guideline or procedure for approval.

Document type (policy, clinical guideline or procedure)	**Guideline**
Document title	**Management of malignant hyperpyrexia in obstetric practice**
Document author (Job title and team)	**Lead obstetric anaesthetic consultant**
New or reviewed document	**Reviewed**
List staff groups/departments consulted with during document development	**Lead obstetric anaesthetic consultant**
Approval recommended by (meeting and dates):	**Women's Business and Governance meeting** **Date: 17/05/2024** **CBU3 Business & Governance** **Date: 28/06/2024**
Date of next review (maximum 3 years)	**17/05/2027**
Key words for search criteria on intranet (max 10 words)	
Key messages for staff (consider changes from previous versions and any impact on patient safety)	
I confirm that this is the FINAL version of this document	**Name: Juliette Thompson** **Designation: Governance Midwife**

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FOR COMPLETION BY THE CLINICAL GOVERNANCE TEAM

Approved by (group/committee):

Date approved:

Date Clinical Governance Administrator informed of approval:

Date uploaded to Trust Approved Documents page: