ELMHURST OUTPATIENT SURGERY CENTER

POLICY/PROCEDURE:	**Management of a Patient with Malignant Hypertermia**	**EFFECTIVE DATE:**	**11/01/00; 10/19/07**
SECTION:	**Perioperative**	**LAST REVISION:**	**9/12/2010; 1/31/2011; 6/2/11 5/30/2012, Reviewed: 2/08/2013**

OBJECTIVE

- To outline the proper procedure for the management of a patient with possible Malignant Hyperthermia
- To provide assistance by referencing the MHAUS Hotline: **1-800-644-9737 (1-800-MH HYPER).**

PLAN COMPONENTS

- ***Signs and Symptoms: when to institute the MH protocol***

  - Patients experiencing malignant hyperthermia may exhibit a number of different symptoms, including, but not limited to:
    - Most consistent indicator of potential MH is an unanticipated increase in End tidal CO_2, when minute ventilation is kept constant (sometimes doubling or tripling)
    - unexplained muscle rigidity; masseter muscle: difficult to open mouth
    - unexplained tachycardia
    - cardiac dysrhythmias
    - change in skin color from flush to mottling to cyanosis
    - tachypnea
  - A later symptom is fever, with temperatures elevating rapidly, as much as 1.8 degree F (1 degree C) every three minutes creating temperatures as high as 114 degrees F (45.5 degrees C).
  - **THIS IS AN EMERGENT SITUATION**

- ***Equipment***

  - MH cart (with Dantrium) is located in OR hallway outside of Sterile Storage. See supply list
    - The cart will be stocked per the latest guidelines from MHAUS (Malignant Hyperthermia Association of the United States)
  - Refrigerated IV Normal Saline is in the OR Medication Room refrigerator.
  - Refrigerated NS for irrigation is in the refrigerator between OR 2 and OR 4.
  - Ice will be taken from the ice machine located in PACU.
  - Regular insulin is in the OR Medication Room refrigerator.
  - Crash cart with defibrillator is locatied in the PACU hallway by bed 6.

- ***If MH occurs outside of the operating room, an anesthesiologist should be notified immediately.***

- ***Personnel to assist with MH treatment***

  Anesthesia Provider

- Stop triggering agents: inhalation anestheics/succinylcholine (rountine use of succinycholine for elective surgery is best avoided in children)
- Call for help/ call for MH cart
- Hyperventilate the patient with 100% oxygen
- Direct MH treatment
- Assigns a member of the team to call 911
- **Directs and participates in resuscitation**
- Places lines: large bore IV site, A-line (if applicable), CVP(if applicable)

Surgeon

- If the pt. is still is still being operated on, the surgical procedure should be concluded ASAP
- Cold saline irrigation of body cavity if applicable
- Wound closure
- After the wound is closed offer assistance to Anesthesia provider

2nd Anesthesia Provider (if available)

- Assist 1st anesthesia provider
- Places NG tube
- Monitor Core Temperature

OR Clinical Coordinator

- Bring MH cart to crisis area
- Initiate MH flowsheet (found on top of MH cart)

PACU Clinical Coordinator

- Bring the crash cart with defibrillator
- Helps mix dantrolene under direction of the Anesthesia provider
    - Reconstituted with 60 ml of sterile water (See mixing instructions on MH Cart)
- Administer IV Dantrolene with initial dose of up to 2.5 mg/kg (IV bolus rapidly)
- Repeat this dose as needed until a maximum dose of 10mg/kg is reachedor episode is controlled.

Circulating Nurse

- **Informs**
    - **OR clinical coordinator #88092**
    - **PACU clinical coordinator #88814**
    - **Attending surgeon (if applicable)**
    - **And anesthesia if not already present.**

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- **Call MH Hotline 1-800-644-9737**
- Retrieve supplies needed for cooling patient
- Initiate cooling of patient (ice packs to groin/axilla)
- Insert foley catheter

OR Scrub Personnel

- Assist anesthesia/surgeon

Pre op & or PACU Nurse (Assigned by PACU Clinical Coordinator)

- Assist with mixing of dantrolene
- Assists with obtaining labs & urine
- Administer medications as ordered by Anesthesia
- Assist with cooling of patients
- Assist with resuscitative measures as directed by Anesthesia

➢ ***Utilize the following cooling methods to reduce the patients temperature***:

- Administer refrigerated IV NS.
- Insert NG tube & directly lavage stomach (connect NG tube to refrigerated NS irrigation with cysto tubing).
- Lavage rectum (connect a 3-way Foley catheter to refrigerated NS irrigation with cystoscopy tubing) or use Asepto syringe to irrigate.
- Insert foley catheter. Avoid bladder irrigation because of need to monitor urine output.
- Apply ice in plastic bags to surface areas – esp. neck, axillae & groin.

➢ ***The following parameters will be recorded on MH Crisis Flowsheet:***

- EKG
- Vital signs (BP, pulse, body temperature)
- O2 saturation
- ET CO_2-if ordered
- Mottling of skin
- Temperature
- Diaphoresis
- Urine color and output

➢ ***Laboratory Studies , if ordered, will be delievered to the lab at EMH***

- Complete Metabolic Profile (CMP): light green tube
- Serum myoglobin: gold tube
- Cardiac enzymes: light green tube
- Coag Studies: light blue tube
- ABG's
- U/A
- Blood cultures

- ***Medication administration***

  - Administer an initial dose of Sodium Bicarbonate 1 to 2 meq/kg. if blood gas values are not yet available.
  - If lab results are known, Treat hyperkalemia in adults with 10 units of regular insulin IV and 50% Dextrose 50 ml. Calcium chloride may also be used.
    - For pediatric patients, treat with 0.1 units regular insulin IV
    - Insulin/kg. and 1ml/kg 50% glucose. Check glucose levels hourly.
  - Dysrhythmias in adults that persist after treatment for acidosis and hyperkalemia may be treated with 100mg Lidocaine bolus followed by a Lidocaine drip of 1 mg/kg.
    - Pediatric patients should receive a lidocaine dosage based on 1mg / kg bodyweight.
    - Do not treat dysrhythmias with calcium channel blocking agents!!!!!!

  - Maintain urinary output by:
    - Mannitol 0.25 mg/kg or LASIX 1mg/kg, repeat as needed.

- ***Preparation of patient for transfer to EMH***
  - Transfer the patient to PACU in preparation for transfer to EMH, following EOSC transfer policy.
  - Counsel the patient and family regarding MH and further precautions.
    - Refer the family to MHAUS 800-644-9737.

AUTHORITY AND RESPONSIBILITY

The Director of Clinical Services, in conjunction with all Clinical Managers/Directors/Coordinators, is responsible for enforcing this policy.

EVALUATION AND IMPROVEMENT

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The evaluation and effectiveness of this policy is conducted by the Director of Clinical Services in collaboration with the Medical Director and reported to the PCC, CRC and Board of Managers as appropriate. Included in the evaluation are recommendations for changes based on trends, incidents, exposures, regulatory standards or the results of new scientific research. The CRC or Board of Managers may also provide direction on additional measures they wish the Director of Clinical Services to implement in order to ensure the objectives of the policy are met.

REFERENCE

Malignant Hyperthermia Association of the United States (MHAUS): Guide to Malignant Hyperthermia in an Anesthesia Setting, 2010 (www.mhause.org).