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**References:**  
**Applicability:** WA - Kadlec Regional Medical Center

## KASC Malignant Hyperthermia Policy and Procedure

### I. Purpose Statement

To outline the steps that will be taken and direct the care of patients who demonstrate Malignant Hyperthermia signs and symptoms at Kadlec Ambulatory Surgery Center during or after surgery.

### II. Definitions

#### A. DRUGS THAT TRIGGER MALIGNANT HYPERTHERMIA:

1. Desflurane
2. Enflurane
3. Halothane
4. Isoflurane
5. Methoxyflurane
6. Sevoflurane
7. Succinylcholine

#### B. SYMPTOMS OF MALIGNANT HYPERTHERMIA:

1. Patients experiencing malignant hyperthermia may exhibit a number of different symptoms, including, but not limited to:
  - i. Unexplained Masseter muscle rigidity
  - ii. Unexplained tachycardia or cardiac dysrhythmia
  - iii. Hypercarbia
  - iv. Change in skin color from flush to mottling to cyanosis
  - v. Myoglobinuria
  - vi. Altered renal function
  - vii. Tachypnea
  - viii. A later symptom is fever, with temperatures elevating rapidly, as much as 1.8 degrees F (1 degree C) every three (3) minutes, creating temperatures as high as 114 degrees F (45.5 degrees C)

2. Most cases of malignant hyperthermia occur during general anesthesia; the one (1) hour period after surgery is also a critical time for developing MH.

### I. Policy Statement

- A. All patients who will undergo general anesthesia shall be:
  1. Screened for a family history of malignant hyperthermia (MH)
  2. Asked if they have had a malignant hyperthermia episode during previous surgeries
  3. Asked if there is a family history of unexpected death or complications from anesthesia
  4. Asked of personal history of unexplained high fever during or within a few hours of surgery
  5. Asked of personal or family history of high temperature or death during exercise
- B. Clinical staff shall receive education regarding malignant hyperthermia, and the proper management of a patient with malignant hyperthermia annually.

### II. Procedure

- A. If malignant hyperthermia is suspected, the following steps shall be taken:
  1. Stop volatile agents and succinylcholine once the diagnosis of malignant hyperthermia is made.
  2. Do not take the time to change the circle system and CO<sub>2</sub> absorbent. If available, insert activated charcoal filters into the inspiratory and expiratory limbs of the breathing circuit.
  3. Hyperventilate with 100% O<sub>2</sub> in an attempt to meet the requirements of the body during the crisis period.
    - i. Consult anesthesia machine manufacturer instructions for purging residual gases.
    - ii. The Circulating RN shall dial x1248 to overhead for MH Code in Room \_\_\_ for additional staff and the MH cart. Front desk will then call 911 for emergency transport. Additional staff shall assist Anesthesia, mix the Dantrolene, assist with cooling the patient, deliver specimens to the Clinical Laboratory, documentation, run for supplies, etc.
    - iii. The surgeon shall close the surgical wound, if possible. If not, the surgeon should pack the wound with saline-soaked surgical towels or laparotomy sponges and cover the wound with a sterile steri-drape. The Circulating RN shall document, on the Intraoperative Nurses' Notes, the number of towels/lap sponges used to pack the wound.
    - iv. Notify Pharmaceutical Services.
    - v. Administer Dantrolene IV as soon as possible. The recommended dosage is 2.5 mg per kg, and repeat the dose until the signs are controlled.  
Dissolve 20 mg of Dantrolene in each vial with a minimum of 60 ml of sterile, preservative-free water for injection.
      - b. As a large quantity may be necessary, a sufficient supply must be available. Vials are available in the ASC, extra vials of Dantrolene are available in Pharmaceutical Services. Additional vials will be obtained by Pharmaceutical Services from outside sources, if needed.
  4. Severe respiratory and metabolic acidosis is to be expected during the crisis.
  5. Cooling the patient is of vital importance. To reduce body temperature:
    - i. Infusion of iced normal saline solutions at 15 ml per kg IV three (3) times. This results in kidney diuresis and temperature reduction. **DO NOT USE LACTATED RINGERS**

**SOLUTION. Lactated Ringers may contribute to acidosis.**

- ii. Surface cooling, utilizing automatic cooling blankets and/or ice packs to the neck, groin and axilla, and underneath the patient if possible.
  - iii. Lavage of the stomach, bladder and rectum is possible using large quantities of cold saline. If fever occurs in the operating room while the peritoneal or thoracic cavity is open, cold saline irrigation can be introduced into the body cavity.
  - iv. Cooling procedures will be discontinued once the patient's temperature reaches 100.4 degrees F (38 degrees C).
6. Do not treat dysrhythmias with calcium channel blocking agents. Calcium channel blockers may cause hyperkalemia or cardiac arrest in the presence of Dantrolene. Use standard drug therapy (lidocaine, amiodarone).
  7. Monitoring lines will be needed to assess cardiac function during aggressive fluid infusion.
  8. Check the patient's electrolytes, especially potassium.
  9. Insert a bladder catheter (3-way irrigation) to monitor urinary output and renal function. Maintaining fluid balance is critical, as cardiac and renal malfunctions are constant threats. Lasix is recommended to ensure diuresis and to protect the kidneys.
  10. Administration of 50 ml 50% Dextrose and 10 units of regular insulin, for adults, may be ordered to provide glucose for metabolism and reduce hyperkalemia by driving potassium back into the cells.
  11. Pediatric patients: 0.1 units insulin per kg and 2 ml per kg Dextrose
  12. Check glucose levels hourly
- B. Patient/Family Education:
1. ASC care staff shall provide postoperative instruction to the patient and/or family on the following:
    - i. Possible side effects of Dantrolene may include nausea, diarrhea, double vision, lightheadedness and muscle weakness
    - ii. Susceptibility of malignant hyperthermia in blood relatives
    - iii. Advise patient and/or family to notify other healthcare providers regarding malignant hyperthermia susceptibility
    - iv. Information on the Malignant Hyperthermia Association of the United States.
- C. Staff Education:
1. ASC/OPS, Anesthesia and PACU staff shall be aware of the following:
    - i. Malignant hyperthermia, although rare, does exist and prompt recognition and intervention are crucial.
    - ii. Dantrolene is kept on the MH cart. Large quantities of sterile water for reconstitution will be kept near the Dantrolene in the refrigerator.
    - iii. Other necessary drugs will be found in the crash cart/MH cart located outside the O.R.'s lead office in the O.R. hallway.
    - iv. Monitoring lines must be available for swift insertion.

- v. Frequent arterial blood gases will be needed and results shall be available as quickly as possible
- vi. ASC/OPS and PACU staff shall immediately restock the MH cart and Dantrolene after a malignant hyperthermia crisis.
- vii. **NOTE: Contact the Malignant Hyperthermia Association of the United States (MHAUS) emergency hotline (1-800-644-9737) (outside of US 001-209-417-3722), <http://www.mhaus.org/> for additional information regarding the management of malignant hyperthermia.**

**III. Implementation and Training Plan**

- A. Each department manager will ensure that employees are notified of new and revised policies that are pertinent to their position.
- B. Employees will be shown how to access policies during the orientation process.
- C. New and updated policies will be posted for review.

**IV. Reference Section**

- A. References:
  - 1. Malignant Hyperthermia Association of the United States (MHAUS), *Guide to Malignant Hyperthermia in an Anesthesia Setting*, 2013.
- B. Prepared/Updated by:
- C. Reviewed by: Policy, Procedure, & Forms Committee, QAPI Committee, ASC Governing Board
- D. Supersedes:
- E. Form:

**Attachments**

No Attachments

**Approval Signatures**

Approver	Date
Rose Bartlett: Cath Lab Manager	03/2019
Michele Dillman: Registered Nurse, Per Diem	03/2019

**Applicability**

WA - Kadlec Regional Medical Center