

MALIGNANT HYPERTHERMIA¹

What is Malignant Hyperthermia?

MH is a chain reaction of signs (a syndrome) triggered in susceptible individuals by commonly used general anesthetics (halothane, enflurane, isoflurane, desflurane, sevoflurane) and the muscle relaxant succinylcholine. The signs include a greatly increased body metabolism, muscle rigidity, and high fever. Death or brain damage may result from cardiac arrest, internal hemorrhaging, or failure of other body systems.

Is pretreatment with dantrolene necessary?

Pretreatment with dantrolene for known susceptibles is no longer routine. The MH Hotline may be contacted for advice.

Who should stock dantrolene sodium and how much?

All facilities where MH triggering anesthetics are administered (including ambulatory surgery centers and offices) should stock a minimum of 36 vials of dantrolene. If potent volatile agents are not used, and succinylcholine is available for resuscitation, then a minimum of 36 vials of dantrolene should be available. If neither potent volatile agents nor succinylcholine are used or available, then dantrolene need not be present.

Where should dantrolene be kept?

Dantrolene should be kept in or very close to the operating room so that it is available immediately if MH occurs. A supply of sterile water for injection USP (without a bacteriostatic agent) should be kept nearby to mix with dantrolene before injection (60 ml/vial).

Are there any advantages in sharing a supply of dantrolene?

Absolutely not. Minutes count in an MH emergency. The Professional Advisory Council of MHAUS strongly recommends that an adequate supply of dantrolene be available wherever general anesthesia is administered. Responsibility for treatment rests with the facility where the surgery is performed and, therefore, sharing is not a good alternative.

MH Cart Supplies

In addition to an anesthesia machine, ECG monitor, pulse oximeter and capnometer, all locations where general anesthesia is administered should contain:

- A plan to treat MH, such as the poster provided by MHAUS.
- A means to continuously monitor end-tidal CO₂, oxygen saturation, and core body temperature.
- A means to actively cool a patient; e.g., a hypothermia blanket, a machine to manufacture ice, and a refrigerator containing at least 3000 ml of cold saline solution.
- An MH cart or kit containing the following drugs, equipment, supplies, and forms should be immediately accessible to operating rooms.

¹ “Managing Malignant Hyperthermia Drugs Equipment and the Antidote, Dantrolene Sodium,” Malignant Hyperthermia Association of the United States (MHAUS)

Drugs

1. Dantrium® IV (dantrolene sodium) – 36 vials (each diluted with 60 ml sterile water)
2. Sterile water for injection USP (without a bacteriostatic agent) to reconstitute dantrolene–1000 ml x 2
3. Sodium bicarbonate (8.4%) – 50 ml x 5
4. Furosemide 40 mg/amp x 4 ampules
5. D50 – 50 ml vials x 2
6. Calcium chloride (10%) x 2
7. Regular insulin 100 units/ml x 1 (refrigerated)
8. Lidocaine HCl (*2%) – 1 box = 2 grams or 20 ml vial x 5

General Equipment

1. Syringes (60 ml x 5) to dilute dantrolene
2. Mini spike® IV additive pins x 2 and MultiAd fluid transfer sets x 2 (to reconstitute dantrolene)
3. Angiocaths: 20G, 2-inch; 22G, 1-inch; 24G, ¾-inch (4 each) (for IV access and arterial line)
4. NG tubes (sizes appropriate for your patient population)
5. Blood pump
6. Irrigation tray with piston syringe (x 1) for NG irrigation
7. Toomy irrigation syringes (60 ml x 2) for NG irrigation
8. Large, clear plastic bags for ice
9. Bucket for ice
10. Disposable cold packs x 4

Monitoring Equipment

1. Temperature probes
2. CVP kits (sizes appropriate for your patient population)
3. Transducer kit

Drip Supplies

1. D5W 250 ml x 1
2. Microdrip IV set x 1

Nursing Supplies

1. Large sterile Steri-Drape (for rapid drape of wound)
2. Three-way irrigating Foley catheters (sizes appropriate for your patient population)
3. Urine meter x 1
4. Toomy irrigating syringe (60 cc) x 2
5. Rectal tubes: sizes (Malecot Drain) 14F, 16F, 32F, 34F
6. Large, clear plastic bags for ice x 4
7. Small plastic bags for ice x 4
8. Tray for ice

Laboratory Testing Supplies

1. Syringes (3 ml) or ABG kits x 6
2. Blood specimen tubes (each test should have 2 pediatric and 2 large tubes)
 - For CK, myoglobin; SMA 19 (LDH, electrolytes, thyroid studies)
 - For PT/PTT, fibrinogen, fibrin split products
 - CBC platelets
 - Blood gas syringe (lactic acid level)
3. Urine cup x 2: myoglobin level
4. Urine dipstick: hemoglobin

Forms

1. Laboratory request forms
 - ABG form x 6
 - Hematology form x 2
 - Chemistry form x 2
 - Coagulation form x 2
 - Urinalysis for x 2
 - Physician order form x 2
2. Adverse Metabolic Reaction to Anesthesia (AMRA) Report form (obtained from MHAUS)
3. Consult form

**Names of on-call physicians available to consult in MH emergencies
may be obtained 24 hours a day through the**

***MH EMERGENCY HOTLINE
1 800 MH HYPER
(1 800 644-9737)***