

Malignant Hyperthermia

In presence of triggering agent: unexpected, unexplained increase in end-tidal CO₂, unexplained tachycardia/tachypnea, prolonged masseter muscle spasm after succinylcholine. Hyperthermia is a late sign.

START

- 1 **Call for help and a code cart**
 - ▶ Ask: "Who will be the crisis manager?"
- 2 **Get Malignant Hyperthermia Kit**
- 3 **Call MH Hotline 1.800.644.9737**
- 4 **Assign dedicated person to start mixing dantrolene**
- 5 **Request chilled IV saline**
- 6 **Turn off volatile anesthetics and transition to non-triggering anesthetics**
 - **DO NOT** delay treatment to change circuit or CO₂ absorber
- 7 **Turn FiO₂ to 100%**
- 8 **Hyperventilate patient** at flows of 10 L/min or more
- 9 **Terminate procedure**, if possible
- 10 **Give dantrolene**
 - MH boxes in workroom and pharmacy
- 11 **Give bicarbonate** for suspected metabolic acidosis (maintain pH>7.2)
- 12 **Treat hyperkalemia**, if suspected
- 13 **Treat dysrhythmias**, if present
 - Standard antiarrhythmics are acceptable;
 - **DO NOT use** calcium channel blockers

14 Send labs

- Arterial blood gas
- Electrolytes
- Serum creatine kinase (CK)
- Serum/urine myoglobin
- Coagulation profile

15 Initiate supportive care

- ▶ Consider cooling patient if temperature > 38.5°C:
 - **STOP** cooling if temperature < 38°C
 - Lavage open body cavities
 - Nasogastric lavage with cold water
 - Apply ice externally
 - Infuse cold saline intravenously
- ▶ Place Foley catheter, monitor urine output
- ▶ Call SCU Coordinator

DRUG DOSES and treatments

Dantrolene • Mix each ampule with 60 cc sterile water
 • 2.5 mg/kg IV every 5 mins until symptoms subside
 • May require up to 30 mg/kg
 • Diluted concentration 0.33 mg/ml

Bicarbonate • 1 - 2 mEq/kg, slow IV Push (for suspected metabolic acidosis)

HYPERKALEMIA treatment

1. Calcium chloride • 10 mg/kg IV
2. Insulin IV/SC 0.1 Unit/kg + Dextrose IV 0.25 -1 gram/kg
3. Sodium bicarbonate: if pH < 7.2
 • 1 - 2 mEq/kg slow IV push

TRIGGERING AGENTS

- Inhalational (volatile) anesthetics
- Succinylcholine

DIFFERENTIAL diagnosis

Cardiorespiratory

- Hypoventilation
- Sepsis

Endocrine

- Thyrotoxicosis
- Pheochromocytoma

Iatrogenic

- Exogenous CO₂ source (e.g. laparoscopy)
- Overwarming
- Neuroleptic Malignant Syndrome

Neurologic

- Meningitis
- Intracranial bleed
- Hypoxic encephalopathy
- Traumatic brain injury

Toxicology

- Radiologic contrast neurotoxicity
- Anticholinergic syndrome
- Cocaine, amphetamine, salicylate toxicity
- Alcohol withdrawal