# Malignant Hyperthermia

In presence of triggering agent: unexpected, unexplained increase in end-tidal \( \text{CO}_2 \), 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 \( \text{CO}_2 \) absorber
7. **Turn FiO\text{2} to 100%**
8. **Hyperventilate patient** at flows of 10 L/min or more
9. **Terminate procedure**, if possible
10. **Give dantrolene**
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 creatinine 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 ICU

## DRUG DOSES and treatments

<table>
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<tr>
<th>Drug</th>
<th>Dose</th>
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| **Dantrolene** | Mix each ampule with 60 cc sterile water  
   - 2.5 mg/kg IV every 5 minutes until symptoms subside  
   - May require up to 30 mg/kg |
| **Bicarbonate** (for suspected metabolic acidosis) | 1 – 2 mEq/kg, slow IV push |

## HYPERKALEMIA treatment

<table>
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| Calcium gluconate | 30 mg/kg  
   - or -  
   **Calcium chloride** | 10 mg/kg IV |
| **Insulin** | 10 units regular IV  
   - 1 – 2 amps D50W |

## DIFFERENTIAL diagnosis

- **Cardiorespiratory**  
  - Hypoventilation  
  - Sepsis  
  - Endocrine  
  - Thyrotoxicosis  
  - Pheochromocytoma
- **Iatrogenic**  
  - Exogenous \( \text{CO}_2 \) 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

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All reasonable precautions have been taken to verify the information contained in this publication. The responsibility for the interpretation and use of the materials lies with the reader. Revised July 2013 (072413.1)