

## MALIGNANT HYPERTHERMIA – Emergency Therapy

### Signs of MH:

- Increasing ETCO<sub>2</sub>
- Trunk or total body rigidity
- Masseter spasm or trismus
- Tachycardia/tachypnea
- Mixed Respiratory and Metabolic Acidosis
- Increased temperature (may be a late sign)
- Myoglobinuria

### ACUTE PHASE TREATMENT

1. GET HELP. GET DANTROLENE – Notify Surgeon
  - Discontinue volatile agents and succinylcholine.
  - Hyperventilate with 100% oxygen at flows of 10 L/min. or more.
  - Halt the procedure as soon as possible; if emergent, continue with non triggering anesthetic technique.
  - Don't waste time changing the circle system and CO<sub>2</sub> absorbant.
2. ADMINISTER DANTROLENE 2-3 MG'KG INITIAL BOLUS RAPIDLY
  - with increments up to 10 mg/kg total.
  - Continue to administer dantrolene until signs of MH are controlled.
  - Occasionally, a total dose greater than 10 mg/kg may be needed.
  - Each vial of dantrolene contains 20 mg of dantrolene and 2 grams mannitol.
  - Each vial should be mixed with 60 mL of sterile water for injection USP without a bacteriostatic agent.
3. BICARBONATE TO CORRECT METABOLIC ACIDOSIS
  - to correct metabolic acidosis as guided by blood gas analysis.
  - In the absence of blood gas analysis, 1-2 mEq/kg should be administered
4. Simultaneous with the above, ACTIVELY COOL the hyperthermic patient.
  - Use IV cold saline (not Ringer's lactate) 15 mL/kg q 15 min
  - Lavage stomach, bladder, rectum and open cavities with iced saline as appropriate.
    - -Surface cool with ice and hypothermia blanket.

\*Monitor closely since overvigorous treatment may lead to hypothermia

5. DYSRHYTHMIAS will usually respond to treatment of acidosis and hyperkalemia. If they persist or are life threatening, standard anti-arrhythmic agents may be used, with the **exception of calcium channel blockers** (may cause hyperkalemia and CV collapse in presence of Dantrolene).
6. Determine and monitor end-tidal CO<sub>2</sub>, arterial, central or femoral venous blood gases, serum potassium, calcium, clotting studies and urine output.
7. HYPERKALEMIA is common and should be treated with hyperventilation, bicarbonate, intravenous glucose and insulin (10 units regular insulin in 50 mL 50% glucose titrated to potassium level or 0.15 u/kg regular insulin in 1 cc/kg 50% glucose). Life threatening hyperkalemia may also be treated with calcium administration (e.g. 2-5 mg/kg of CaCl<sub>2</sub>).
8. Ensure urine output of greater than 2 mL/kg/hr by hydration and/or administration of mannitol or furosemide. Consider central venous or PA monitoring because of fluid shifts and hemodynamic instability that may occur.