Malignant Hyperthermia
Objectives

• Identify Etiology of Malignant Hyperthermia (MH)
• Identify Clinical Presentation of MH crisis
• Identify acute treatment for MH crisis
What is Malignant Hyperthermia (MH)?

- An inherited genetic mutation which results in sustained calcium release and subsequent muscle contraction.
- Results in hypermetabolic state
  - Increase lactate
  - Increased Carbon Dioxide (CO2)
  - Increased heat
- Acidosis
- Rhabdomyolysis
- Hyperkalemia
- Arrhythmias
- Organ damage
- Death
Prevalence

- Genetic mutation can occur as often as 1 in 3,000.
- Having this mutation does not mean an individual will experience an MH crisis during every exposure to general anesthetic.
- MH episode can occur in as little as 1-5,000 to 1-50,000 (varying stats)
- Mortality as high as 70% prior to the 1980’s to less than 10% today.
Triggering Agents

• Inhaled General anesthetics
  – Desflurane
  – Isoflurane
  – Halothane
  – Sevoflurane

• Depolarizing muscle relaxants
  – Succinylcholine
Non-Triggering Agents

- Sedative hypnotics (propofol, ketamine, diazepam, ect)
- Inhaled nonvolatile general anesthetics (Nitrous Oxide)
- Local anesthetics (all)
- Opioids (all)
- Muscle relaxants (all nondepolarizing)
- Anxiolytics (all benzodiazepines)
Clinical Presentation

• Increased end tidal CO2 (most reliable initial sign)
• Sinus tachycardia
• Masseter muscle spasm and general muscle rigidity
• Hyperthermia (late sign)
• ECG changes
  – Hyperkalemia results in peaked T-waves, PVC’s, Ventricular arrhythmias
• Brownish-red tea colored urine
Clinical Presentation

• Can result in:
  – DIC
  – Pulmonary edema
  – Renal failure
  – Coma
  – Death if untreated

• Following successful treatment 20% will experience recurrence within 24 hours
Acute Treatment

• Get help - get Dantrolene!
  – In the OR:
    • Discontinue anesthetic triggering agents
    • Increase O2 to 100%
    • Procedure should be aborted if elective
    • Call for help
    • Contact MHAUS for directive
    • Don’t waste time changing CO2 absorbant
  – On the Nursing Unit:
    • Call for help
    • Get the MH cart and Crash Cart
    • Contact MHAUS for directive
Acute Treatment

- Preparation and administration of Dantrolene - *The ONLY drug that treats MH*
  - 2.5mg/kg - 10mg/kg
  - Mix each 20mg vial of Dantrolene with 60ml sterile water
- Bicarbonate for acidosis
  - 1-2mEq/kg
Acute Treatment

• Cooling measures (Stop cooling if temp < 38c)
  – Uncover the patient if possible
  – Chemical cooling packs
  – Ice packs
  – NG lavage
  – Rectal lavage
  – Cooled IV NaCl (not LR)
  – Wound irrigation with cold fluid
• Temperature monitor
  – Foley
  – Esophageal
Acute Treatment

• Dysrhythmias usually respond to treatment of hyperkalemia and acidosis
  – Code cart should be brought to room as well.

• Hyperkalemia treatment
  – Calcium
  – Bicarbonate
  – Insulin-glucose
Acute Treatment

• Labs:
  – ABG’s
  – Electrolytes
  – CBC
  – PT/PTT
  – CK
  – Urine
Location of MH Cart

• Operating Room
  – Equipment Storage Room
  – Just inside the door on the left side

• Contents
  – Medications
  – Fluids
  – Tubes for blood work
  – Syringes & needles for mixing

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