Malignant hyperthermia: what you need to know essay

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Malignant Hyperthermia: What You Need to Know Ivy O. Corlew, BSN, RN, CNOR Conneaut Medical Center–OR Malignant Hyperthermia: What You Need to Know What is Malignant Hyperthermia or MH Malignant Hyperthermia (MH) is a rare, life threatening, pharmacogenetic disorder characterized by hypermetabolic state of skeletal muscle induced by inhalation anesthetics like halothane, sevoflurane, desflurane and the depolarizing muscle relaxant agent like succinylcholine (Rosenberg et al, 2007).

Clinical signs are; Increased end tidal CO2 production which is an early sign, tachycardia, tachypnea, trunk or total body rigidity, masseter (jaw) muscle rigidity after succinylcholine which occurs commonly in children, marked temperature elevation (maybe a late sign), respiratory and metabolic acidosis, myoglobinuria(MHAUS, 2011). If left untreated the patient will experience cardiac arrest, kidney failure, blood coagulation problems, internal hemorrhage, and possibly death (slideshare, 2010) Nursing Assessment

Nurses taking care of surgical patients must be knowledgeable regarding MH so they can identify clinical signs and symptoms early on, its emergent treatment, and be able to respond promptly and appropriately. Preoperative assessment by nurses are crucial in identifying the patient, who could be at high risk for Malignant Hyperthermia, so MH triggering agents can be avoided during anesthesia. Example of questions to ask to help screen for MH susceptibility are (AORN 2012): 1. Has anyone ever told you that you had a “ bad” reaction to anesthesia? 2. Has anyone ever told you that you or your family member had a problem with anesthesia? . Have you or a family member experienced a high fever while under anesthesia? 4. Has anyone

ever told you or a family member they had a difficult time opening your jaw during general anesthetic? 5. Has anyone in your family died unexpectedly in the operating room? 6. Have you or anyone in your family experienced sunstroke or heat stroke resulting in hospitalization? 7. Have you ever noticed dark “ cola-colored” urine after a general anesthetic or after experiencing a heat-related illness? Treating MH Dantrolene IV is the only drug available in the market to treat Malignant Hyperthermia.

It is difficult to mix and is time consuming to reconstitute. It comes in yellowish colored powder that when fully mix with non-bacteriostatic sterile water, the color stays the same. The new brand Dantrium IV (dantrolene sodium for injection) mixes in just 20 seconds (MHAUS, 2011). However, this is not what we have stocked in our cart. According to MHAUS (2011), dantrolene suppresses the exaggerated rise in muscle cell calcium that seems to trigger MH by binding to the calcium channel site in muscle that is responsible both for calcium release and, likely, calcium entry into the cell.

Dantrolene may cause significant muscle weakness in patients with preexisting muscle disease and should be used with extreme caution in those patients. When used with calcium channel blockers (verapamil or diltiazem), dantrolene may produce life-threatening hyperkalemia and myocardial depression. Once a patient has been successfully treated for 36 hours with intravenous dantrolene, he/she may be switched to oral dantrolene until the CK or Creatine Kinase level is trending down and there is no further evidence of acidosis or hypermetabolism and temperature spikes. A recommended 36 vials be stocked.

Treating Malignant Hyperthermia crisis is a complex nature, and it involves several staff members. The first thing to do in the event of suspected MH crisis is to recruit extra staff. The following steps are outline by role (MHAUS, 2011): The surgeon should stop or complete the procedure as soon as possible. The anesthesia provider stops inhalation agents; stops warming blanket; increase minute ventilation; inserts esophageal temp probe; inserts NG tube for lavage as needed; administers dantrolene IV; inserts an arterial line; draws blood for chemistry, ck, coagulation, ABG.

If peaked T waves on ECG, administers calcium then glucose and insulin. If T waves are not peaked and arrhythmia present, injects bicarbonate. The circulating nurse brings in MH cart; mixes dantrolene based on 2. 5 mg/kg with 60 ml of non-bacteriostatic sterile water, repeat dose until the signs are controlled. The circulating nurse should document the event. A second nurse assist in mixing dantrolene and hands syringe to anesthesia provider. A third nurse brings in emergency crash cart; places urinary catheter; assist in drawing blood or with other task.

A fourth nurse brings in plastic bags with ice and cold IV fluids; places ice bags on exposed parts like groin, axilla, and neck (without compromising sterility); iced saline lavage of any open body cavities such as the stomach, bladder, or rectum. Cold I. V. fluids are administered using 0. 9% sodium chloride, but Lactated Ringer’s is avoided so that acidosis is not worsened (Martin, 2009). Stop cooling measures when temperature falls to 38°C (MHAUS, 2011). A laminated copy of MHAUS dantrolene dosage chart is located on top of MH cart to minimize precious time wasted in calculating dosage per kilogram.

As soon as patient is stabilized, transfer patient to ICU or call transfer center for an emergent transfer to UH Case SICU or ED. Knowing your Role All staff involved in the MH crisis response should conduct a debriefing meeting as early as possible. Points to consider including (AORN, 2012): 8. Was the MH cart adequately stocked and immediately available? 9. Were enough staff members available to manage the crisis effectively? 10. When staff members responded, were they familiar with task expected in MH crisis? 11. Was MHAUS appropriately notified? 12. Do staff members have other ideas about planning care for a future MH crisis? 3. Has a root-cause analysis been done (MH is considered a sentinel event)? Staff Competency By using the mannequin as our patient, and mixing the expired dantrolene from MHAUS, perioperative staff did fairly well during the MH mock drill simulation by following thru with the expected roles. MH drill should be held at least quarterly to help perioperative staff practice early recognition of MH crisis and how to act accordingly. MH drill also improve OR (operating room) team coordination and provides opportunities to serve in each of the four roles mentioned (Martin, 2009). Prevention

Early detection of clinical signs and symptoms of MH, knowing your role and a prompt response to this emergent crisis can save your patient’s life. MH crisis prevention is the key and the best treatment you can provide to your patient. Knowledge about MH is a must for nurses taking care of a patient before, during and after operative care. Armed with this knowledge, you can make a difference in your patient’s lives. References AORN (2012). AORN Malignant Hyperthermia Guideline. In Perioperative Standards and Recommended Practices: For Inpatient and Ambulatory Settings (pp. 5, 8-9).

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