

# AORN Malignant Hyperthermia Guideline

## Part I: Overview

### A. Introduction

The "AORN malignant hyperthermia (MH) guideline" was created to provide clarity regarding assessment and treatment of MH and to familiarize perioperative nurses and other health care providers with the resources and tools available for staff development training. This guideline is specific to perioperative care for patients confirmed to have, or who are thought to be susceptible to, MH. This guideline includes the history, pathophysiology, and risk factors of the disease; protocols for treating a patient in MH crisis; considerations for education and counseling for patients and families determined to be at risk for developing MH; evaluation of care after an MH crisis; and a guide for planning staff member education.

This guideline is based on current, available research and incorporates information from the Malignant Hyperthermia Association of the United States (MHAUS) protocol. The MHAUS is a nonprofit organization dedicated to assisting in the diagnosis and treatment of MH. The MHAUS protocol was developed by a panel of experts based on scientific research and is viewed as the national guideline or standard of care for the MH patient.<sup>1</sup> Clinicians may need to tailor this guideline to specific patient needs.

AORN recognizes the numerous types of settings in which perioperative nurses practice. This guideline is intended to be adaptable to various practice settings. These practice settings include traditional ORs, ambulatory surgery units, physicians' offices, cardiac catheterization suites, endoscopy suites, radiology departments, emergency departments, labor and delivery units, and all other areas where operative and other invasive procedures may be performed.

The AORN Board of Directors approved the original guideline in February 1997. This current version of the guideline has been reviewed and updated by the AORN Nursing Practice Committee and approved by the AORN Board of Directors in November 2006. Content experts from various practice disciplines (eg, perioperative nurses, perianesthesia nurses, critical care nurses, nurse anesthetists, anesthesiologists) who have experience in managing MH or specific knowledge about MH were invited to provide feedback for consideration and incorporation into the final guideline.

### Definition

Malignant hyperthermia is a rare genetic condition characterized by a severe hypermetabolic state and rigidity of the skeletal muscles. It occurs when affected individuals are exposed to a triggering agent such as inhalation anesthetics and succinylcholine, a depolarizing muscle relaxant.<sup>2,3</sup> The triggering agent causes a series of chain reactions in the body related to an increase in intracellular calcium ion concentration.

### "Awake" Malignant Hyperthermia

In 1966 an "awake MH" episode was identified as the Porcine Stress Syndrome when pigs were observed to die rapidly when under stress (eg, fighting). In 1974, studies were done for "human stress syndrome," related to sudden deaths in a MH susceptible family. The deaths were unrelated to surgery and thought to be related to exercise and emotion-induced pyrexia.<sup>1</sup>

Studies have continued since that time focusing on physiological changes resulting from stress-related MH (eg, evidence of pH changes in an MH-susceptible muscle recovering from extreme exercise). In spite of potential correlations between exertional heat stroke and MH, dantrolene sodium is not recommended for routine use when managing heat stroke.<sup>2</sup>

Awake MH triggered by stress is common in MH-susceptible swine, but it is not found to be common in MH-susceptible humans.<sup>3</sup> Humans are not the only species to develop MH crises. Reactions have been described most often in pigs, but there are also reports in horses, dogs, and other animals, which helps facilitate research.

### REFERENCES

1. Wingard D W. Malignant hyperthermia: a human stress syndrome? *The Lancet*. [Letter to the Editor]. 1974; 2: 1450-1451.
2. Rosenberg H, Davis M, James D, Pollock N, Stowell K. Malignant hyperthermia. Orphanet encyclopedia, November 2004. <http://www.orpha.net/data/patho/GB/uk-malignant-hyperthermia.pdf>. Accessed September 7, 2006.
3. Gronert GA, Pessah IN, Muldoon SM, Tautz TJ. Malignant hyperthermia. In: Miller, R D, ed. *Miller's Anesthesia*. 6th ed. Philadelphia, Pa: Elsevier, Churchill Livingstone; 2005: 1169-1190.