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MALIGNANT HYPERTHERMIA

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Malignant hyperthermia (MH) is a rare, life-threatening inherited disorder triggered by volatile inhalational anesthetics and/or the depolarizing muscle relaxant suxamethonium. In susceptible individuals, calcium release from the sarcoplasmic reticulum in the skeletal muscle becomes abnormally accelerated, leading to a hypermetabolic state. Early signs of MH include unexplained hypercarbia (end-tidal carbon dioxide > 55 mm Hg), tachycardia, and muscle rigidity, particularly in the masseter. Rapid increases in core temperature (> 0.5 °C/15 min, with temperatures often exceeding 40 °C) are typical. With progression, respiratory and metabolic acidosis, arrhythmias, cola-colored urine (myoglobinuria), elevated serum potassium, and tented T-waves may develop, potentially leading to cardiac arrest or multiorgan failure. The Society of Anesthesiologists' guidelines for the management of MH in 2025 (Japanese version) emphasize the importance of early recognition and immediate intervention. The essential steps include discontinuing triggering agents, administering intravenous dantrolene (initially 1-2 mg/kg), aggressive cooling of the body, and managing complications, such as hyperkalemia and acidosis. On the basis of international standards, a higher initial dose of dantrolene is recommended. Preoperative assessment of MH risk should include history taking for anesthetic complications, a family history suggestive of MH susceptibility, signs of congenital myopathies, and careful anesthetic planning using non-triggering agents. Genetic testing and muscle biopsy may aid in the diagnosis but are not definitive in all cases. Further treatment includes managing complications related to a hypermetabolic response such as hyperkalemia and arrhythmias. This review is focused on the recognition and treatment considerations of MH in the emergency department to optimize therapy and improve patient morbidity and mortality.

Keywords: Malignant hyperthermia (MH), Dantrolene, myoglobinuria, treatment.