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Non-malignant hyperthermia and malignant hyperthermia confused

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To the Editor

This letter is in response to the recent case report, “Malignant hyperthermia associated with diabetic hyperosmolar hyperglycemic nonketotic state in a young man”, by Amir R. Baluch and Sanjay P. Oommen [1]. We question the declarative use of the term “malignant hyperthermia” in the title, rather than the less certain, and more appropriate, term “malignant hyperthermia-like syndrome”, as used in Reference 1 of the report. There are no pathognomonic signs of MH, and a number of different pathophysiological states may mimic MH. Indeed, this journal published such a case entitled “Nonmalignant hyperthermia on induction of anesthesia in a pediatric patient undergoing bi-directional Glenn procedure”[2]. The only definitive tests for MH available at present are a genetic test for known causative mutations in the skeletal muscle intracellular Ca^{2+} release channel, the type 1 ryanodine receptor (RYR1) (see www.emhg.org for a list of these mutations), or, in North America, a live muscle biopsy specimen subjected to a caffeine-halothane contracture test [3]. Unfortunately, the patient expired, and no post-mortem material was reported to have been sent for genetic testing. Had the authors successfully treated the patient’s fever with dantrolene, the assignment of MH as the cause might be more tenable [4]. However, dantrolene has been reported both to ameliorate the effects of sepsis [5] and act as an antipyretic [6,7], so that

successful suppression of fever by this drug is not to be construed as diagnostic of MH. To declare that this patient had MH is, therefore, unfounded.

Other factors could have contributed to this diabetic patient's symptom complex. Despite negative blood cultures, an elevated temperature still could have been due to infection (1+ bacteruria), and severe volume contraction, as evidenced by a hematocrit of 61.3% and a BUN of 49 mg/dL, which may have contributed to this temperature rise. Indeed, the dehydration seen in exertional heat illness is also associated with a rapid rise in temperature and death. Rapid transfusion of cold saline with the onset of hyperthermia is likely to have contributed to the acute rise of serum sodium from 149 to 169 mEq/L and chloride from 101 to 142 mEq/L. Acute hypernatremia and hyperosmolarity (glucose>1,100 in this case) both can induce rhabdomyolysis [8,9], and the potential for all of these to cause cardiac arrest should not be underestimated.

Finally, the discussion of cresol (4-CmC) triggering of MH in susceptible patients is misleading. As has been shown, 4-CmC can induce MH in susceptible swine, but only at doses 150-fold higher than that found in commercial preparations [10]. In light of the above, associating this patient's hyperthermic event with the onset of insulin infusions containing extremely low concentrations of 4-CmC as preservative is simply untenable.

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