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## Prophylactic and Therapeutic Doses of Dantrolene for Malignant Hyperthermia

*To the Editor:*—We have several comments regarding the recent case report by Ruhland and Hinkle[1] of a boy who developed signs of malignant hyperthermia (MH) following halothane–succinylcholine anesthesia, who was subsequently muscle biopsy positive for MH and who developed evidence of MH following dantrolene pretreatment while receiving a nontriggering anesthetic.

First, it would be helpful to learn results of the muscle biopsy test used to determine MH susceptibility and in which laboratory the test was performed.

Second, the authors cite our work[2] for choosing "adequate" pretreatment and yet did not follow the recommendations. We reported that maximal skeletal muscle depression, as monitored by indirectly evoked twitch, occurred following dantrolene 2.4 mg/kg iv in healthy adult volunteers, and this was associated with twitch depression of 75%. We speculate that a dantrolene dose producing maximal skeletal muscle depression provides prophylaxis and therapeusis for MH anesthetic challenge.[3] The child reported by Ruhland and Hinkle may not have received such a dantrolene dose; only 1.0 mg/kg was given iv following oral dosing of 4 mg/kg. Children who received oral dantrolene, 4–12 $mg \cdot kg^{-1} \cdot day^{-1}$ [4] did not reach dantrolene blood levels that we predict would be prophylactic.[2]

Our current practice for managing MH suspect patients includes the intravenous administration of dantrolene 2.5 mg/kg over 10–15 min just prior to induction of anesthesia in an attempt to achieve prophylaxis. We recommend a similar dantrolene dose for the initial treatment of MH crisis based upon our previous work[2] and that of Kolb *et al.*,[5] who reported that dantrolene 2.5 mg/kg iv was therapeutic for MH crisis.

We propose that the case reported by Ruhland and Hinkle represents inadequate dantrolene dosage for prophylaxis MH pretreatment but adequate dantrolene treatment. We continue to encourage the use of dantrolene iv because the blood levels obtained are more predictable than those following oral dosage.

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*In reply:*—At the time we cared for the patient mentioned in our case report, the work of Flewellen and Nelson was not published. It was only during the preparation of our case report that we were aware of their work. At the time we cared for the patient who developed malignant hyperthermia, there was no well-documented prophylactic regimen, and we used a regimen that many would have considered adequate. (Anesthesia Technical Bulletin No. 1, November, 1982 in the ASA Newsletter.) We agree with Flewellen and Nelson that at the present time their suggested prophylaxis should be followed.

The muscle biopsy on the patient in our case report was performed in the laboratory of Dr. John Ryan at Massachusetts General Hospital in Boston, Massachusetts, and the following are the results of this patient's biopsy: calcium uptake by thin section at 37° C, 2.3 $\mu mol \cdot g^{-1} \cdot min^{-1}$; actomyosin ATPase activity in thin section as measured by the concentration of precipitated calcium phosphate in muscles, 0.10 $\mu mol \cdot g^{-1} \cdot min^{-1}$; actomyosin ATPase histochemical staining results (fiber type distribution) Type I, 59; Type IIa 35, Type IIb, 6.

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