SUXAMETHONIUM AND MALIGNANT HYPERTERMIA

Siri.—The letter by Dr Nelson [1] concerning the in vitro response of human skeletal muscle to suxamethonium deserves comment. Dr Nelson reports that skeletal muscle from three family members tested positive for malignant hyperthermia (MH) responded with contractures when challenged with suxamethonium 5 (one patient) or 50 (two patients) mmol litre\(^{-1}\). He states that “Further studies are needed to clarify these effects of suxamethonium on MHS muscle”. The results reported contrast with those from Dr Denborough’s laboratory [2], with our own results [3, 4] and with the results of several other investigators [see 3, 5]. Dr Nelson also reports that gracilis muscle from four MH susceptible pigs exhibited contracture responses to suxamethonium 50 mmol litre\(^{-1}\) [1]. This is in contrast to Dr Denborough’s [2] results and our negative findings with gracilis muscle from six pigs (F1 generation from a Yorkshire x Duroc cross) challenged in vitro with halothane to verify MH susceptibility (unpublished studies).

The results obtained by Dr Nelson in porcine muscle in vitro may be explained by differences between breeds in muscle responses to agents associated with MH, as suggested in his letter. An example of a possible breed difference in response to halothane has been reported by Gallant [6]. In this latter study, halothane caused a small plasmalemmal depolarization in muscle from MH susceptible Poland China pigs. However, this depolarization was not observed in MH-susceptible Pietrain pigs. Certainly, Dr Nelson’s results obtained in the pig cannot relate specifically to MH, as some breeds do not show a contracture to suxamethonium. Perhaps the response to suxamethonium is the manifestation of some other skeletal muscle correlate of the MH defect expressed only in the breed used by Dr Nelson.

We know that skeletal muscle (diaphragm) from animals not susceptible to MH can exhibit contractures to suxamethonium. Previously we have reported occasional contractures to suxamethonium in rat diaphragm preparations [7] and, more recently, we have observed consistent and large (25–33 % twitch height) contractures to suxamethonium 50 mmol litre\(^{-1}\) in mouse (male Swiss-Webster albino) diaphragm preparations (unpublished observations) which closely resemble those in human skeletal muscle and the “small” contracture in porcine gracilis muscle reported by Nelson [1]. We have only observed occasional small (one patient = 0.4 g; two patients = 0.3 g; two patients = 0.2 g) contractures to suxamethonium 50 mmol litre\(^{-1}\) in muscle from 97 patients diagnosed as MH susceptible ([3, 4] and unpublished observations). These contractures were similar in magnitude to suxamethonium contractures observed by other investigators [5]. Therefore, we do not believe that a contracture to suxamethonium relates to MH.

The fact that the three patients exhibiting contractures to suxamethonium in the Nelson study were from the same family suggests that this family possesses some abnormality unrelated to the MH defect. This abnormality is not shared by the three MH susceptible patients who were not family members in the same study. We find the observations of Dr Nelson interesting. However, we do not believe that contractures to suxamethonium relate specifically to MH.

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REFERENCES


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