Correspondence

Single dose medication

To the Editor:

The authors of "Single dose medication vial packaging deficiencies"¹ are to be congratulated for their pursuit of this problem.

While statements about the "responsibility of the end user"¹ may provide legal cover, such an attitude does not enhance safety. Practitioners bear responsibility but it is naive to expect products will always be used under optimum conditions. Practitioners will mistakenly use single dose products on more than one patient, if presented with a vial not clearly labeled or designed such that it appears not to have been used. Misuse is particularly likely if practitioners are carrying out several tasks at once, tired, or distracted. Errors will occur when the "limits of the brain's information processing capacity are reached". It is pointless to blame the individual.²

Manufacturers must make products that are safe not only when used by alert individuals working in optimum conditions. They should anticipate "factors that provide the conditions in which errors occur",³ those worst case, error producing conditions. Single dose vials systems must be engineered to maximize safety at each stage of patient care:

- a) reducing the chance of error occurring, (i.e., the anesthesiologist choosing a particular vial) - through clear labeling of vials as single dose products;
- b) trapping the error as it occurs (i.e., the anesthesiologist using that particular vial) - by designing vials so that previous entry will be obvious; and
- c) minimizing the consequences of the error - by monitoring for adverse incidents.⁴

Patients and practitioners need and deserve such a system.

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- 2 Vincent CA. Risk, safety and the dark side of quality. *BMJ* 1997; 314: 1775-6.
- 3 Reason J. Understanding adverse effects: human factors. In: Vincent CA (Ed.). *Clinical Risk Management*. London: BMJ Publishing Group, 1995: 31-54.
- 4 Davies J.M. Risk assessment and risk management in anaesthesia. In: Aitkenhead AR (Ed.). *Quality Assurance and Risk Management in Anesthesia*. Bailliere's Clinical Anaesthesiology International Practice and Research. London: Bailliere Tindal, 1996; 10: 357-72.

Prevention of succinylcholine fasciculations

To the Editor:

The title of an article is crafted to entice readers to read the text below. One of the minimum requirements is that it be correct and correlate to the article. Imagine my surprise when reading the conclusion to the article titled "Rocuronium is the best nondepolarizing relaxant to prevent succinylcholine fasciculation and myalgia."¹ One can only conclude rocuronium pre-treatment reduces muscle pain after succinylcholine administration. However, the conclusion of the article is that rocuronium pre-treatment does not reduce succinylcholine myalgia when compared with the control group. At the very least it is the responsibility of reviewers and authors to make sure the title is reflective of the article's content and conclusion.

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REFERENCE

- 1 Martin R, Carrier J, Pirlet M, Claprood Y, Tétrault J-P. Rocuronium is the best non-depolarizing relaxant to prevent succinylcholine fasciculations and myalgia. *Can J Anaesth* 1998; 45: 521-5.

To the Editor:

The recent paper by Martin *et al.*¹ on the efficacy of various nondepolarizing relaxants in preventing succinylcholine-induced fasciculations includes some statements that require comment.

1. The statement that the doses employed approximated 10% of the "intubating dose" implies that

these doses were roughly equipotent. This is not the case. While vecuronium, atracurium, and rocuronium were given in doses equivalent to $0.2 \times$ the ED_{95} , the dose of d-tubocurarine administered represents only $0.1 \times ED_{95}$, and $0.20 \text{ mg} \cdot \text{kg}^{-1}$ mivacurium equals almost $0.3 \times ED_{95}$.

- The authors cite McCoy *et al.* in hypothesizing that the variations in effects observed among the drugs tested might be secondary to differences in prejunctional activity. A more recent paper² by these authors suggests otherwise. They examined differences in pre-junctional effects of different relaxants by measuring the TOF fade during the onset and recovery of neuromuscular block. The relaxants studied were atracurium, mivacurium, rocuronium and vecuronium. Differences among the relaxants were insignificant.
- Since rocuronium pre-treatment delayed the onset of succinylcholine-induced block to the greatest extent, perhaps the manuscript should be retitled "Rocuronium is the worst nondepolarizing relaxant..."

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- McCoy EP, Connolly FM, Mirakhur RK, Loan PB, Paxton LD. Nondepolarizing neuromuscular blocking drugs and train-of-four fade. *Can J Anaesth* 1995; 42: 213–6.

To the Editor:

We read with much interest the article by Martin *et al.*¹ regarding the use of non-depolarizing muscle relaxants to prevent succinylcholine-induced fasciculations and myalgias. Convincing evidence was presented indicating that rocuronium is the most effective agent in preventing fasciculations. However, it was unclear how long before succinylcholine one should administer rocuronium. The methods section of the paper indicated that rocuronium was given seven minutes before the succinylcholine, whereas the discussion and abstract stated that it was administered 5.5 and 4 minutes before succinylcholine, respectively. From a clinician's perspective, it is important to know exactly when rocuronium should be given.

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REPLY

We would like to thank Drs. Kopman, Daley, Norman and Mensink for their interesting and constructive remarks concerning our paper.¹

As stated in our paper, the doses employed were taken from a table of Miller's textbook, *Anesthesia*. They represent 10% of the suggested doses providing good intubating conditions under light anaesthesia.²

Concerning the pre-junctional activity, we apologize for not having quoted McCoy *et al.*³ As established in their study, fade is greater during recovery of block than during onset. Rocuronium showed a slightly greater fade at that time and it is possible that its rapid onset allows little time for development of fade.

Pre-treatment, especially with rocuronium, effectively delay the time for maximal twitch depression following succinylcholine.

Concerning the timing of the pre-treatment in regard to the succinylcholine injection, in our study, pre-treatment was given at time 0 and succinylcholine $1.5 \text{ mg} \cdot \text{kg}^{-1}$ was given four minutes later. Tracheal intubation was achieved 1.5 min after succinylcholine, that is 5.5 min after pretreatment.

We apologize for the title which should have been: "Rocuronium is the best non-depolarizing relaxant to prevent fasciculations". Rocuronium and all the other pre-treatment drugs studied did not prevent myalgia.

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