CORRESPONDENCE

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To enhance the timeliness of publication of Letters to the Editor, the Editorial Board approves the changes whereby prepublication proofs of Letters accepted for publication will no longer be available. Additional guidelines regarding Letters to the Editor can be found in the Guide for Authors.

Succinylcholine and Open Eye Injury

To the Editor:—With great interest, we read the article by Libonati *et al.*, "The Use of Succinylcholine in Open Eye Surgery."[1] It is an informative report of a great number of cases. However, the conclusions deserve some comment:

1. There can be no doubt that succinylcholine increases intraocular pressure (IOP), even under deep anesthesia (fig. 1).
2. This increase cannot be prevented completely by any of the many methods suggested in the literature.[2–4]
3. The fact that there are no case reports on loss of vitrous following administration of succinylcholine in a "preblocked" patient has been described before.[5]
4. The authors have described 63 cases of open eye injury that had been pretreated with a nondepolarizing neuromuscular blocking drug and intubated with succinylcholine. According to the formula of Hanley *et al.*,[6] this does not ensure absolute safety but rather reduces the risk to around 5% (with 95% confidence). The conclusion should be, therefore, that there were no inadvertent results observed in 63 patients, leaving it up to the reader to decide whether this is acceptable or not.
5. Even if there were indeed no loss of vitrous in the 63 cases, the question remains whether the mechanisms initiated by succinylcholine on the eye, which Cook has described as "detrimental",[3] are desirable or rather to be avoided.

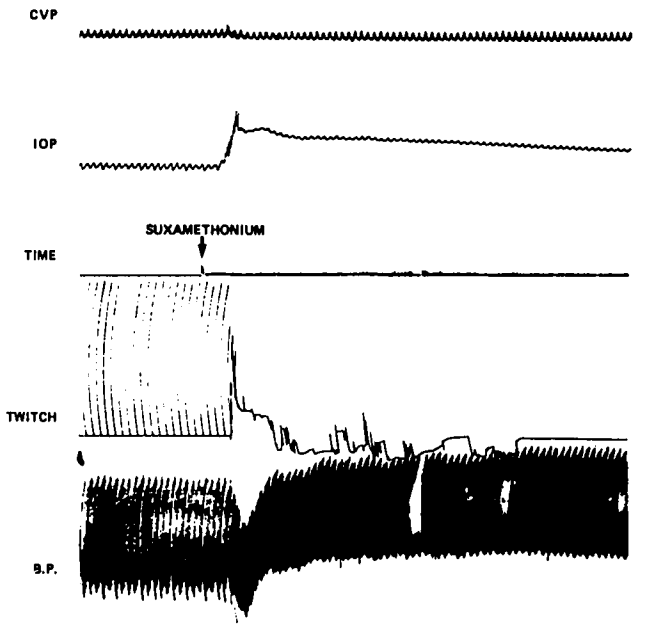

FIG. 1. Cardiovascular and IOP response to the administration of succinylcholine 1 mg/kg in a dog, anesthetized with high-dose fentanyl.

A more general question in this context is how we should deal with scientifically substantiated findings of anesthesiologic research. The majority of the anesthetic community, for example, prefers not to use ketamine in patients with coronary heart disease. This preference is not based on any documentaion that ketamine causes myocardial infarction but only on the rationale that ketamine will increase all parameters of myocardial oxygen consumption. If we believe in anesthetic intelligence, this attitude will not be altered by any reports on a successful ketamine anesthesia for coronary surgery.[7,8]

We certainly agree with Libonati *et al.* that "succinylcholine and rapid induction" is an entirely different subject than "succinylcholine and IOP," and that this issue is yet far from closed. With respect to the "modern nondepolarizing neuromuscular blocking drugs," atracurium was mentioned as having IOP-lowering properties. The reference quoted for that statement was describing the IOP effects of alcuronium[9] rather than those of atracurium. The latter, in contrast, was found not to alter IOP.[10]

If neuromuscular blockade is required for ophthalmic surgery, we suggest the use of vecuronium, which offers cardiovascular stability and—in most patients—probably reduces IOP.[11]

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REFERENCES

1. Libonati MM, Leahy JJ, Ellison N: The use of succinylcholine in open eye surgery. ANESTHESIOLOGY 62:637–640, 1985
2. Murphy DF: Anesthesia and intraocular pressure. Anesth Analg 64:520–530, 1985
3. Cook JH: The effect of suxamethonium on intraocular pressure. Anaesthesia 36:359–365, 1981
4. Fjeldborg P, Hecht PS, Busted N, Nissen AB: The effect of diazepam pretreatment on the succinylcholine induced rise in intraocular pressure. Acta Anaesthesiol Scand 29:415–417, 1985

5. McGoldrick KE: Pediatric anesthesia for ophthalmic surgery, Anesthesia for Ophthalmology. Edited by Bruce RA, McGoldrick KE, Oppenheimer P. Birmingham, Aesculapius, 1982, p 75
6. Lerman J: Is nothing certain with small sample sizes? (letter). ANESTHESIOLOGY 61:219–220, 1984
7. Hatano S, Keane DM, Boggs, RE, El-Naggar MA, Sadove MS: Diazepam ketamine anaesthesia for open heart surgery—a micromini drip administration technique. Can Anaesth Soc J 23: 648–656, 1976
8. Reves JG, Lell WA, McCracken LE, Kravett RA, Prough DS: Comparison of morphine and ketamine: Anesthetic techniques for coronary surgery, a randomized study. South Med J 71: 33–36, 1978
9. Balamoutsos NG, Tsakona H, Kanakoudes PS, Iliadelis E, Georgiades CG: Alcuronium and intraocular pressure. Anesth Analg 62:521–523, 1983
10. Maharaj RJ, Humphrey D, Kaplan N, Kadwa H, Blignaut P, Brock-Utne JG, Welsh N: Effects of atracurium on intraocular pressure. Br J Anaesth 56:459–463, 1984
11. Jantzen J-P, Hackett GH, Erdmann K, Earnshaw G: Vecuronium and the eye—A study of intraocular pressure. Br J Anaesth (in press)

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In reply:—We appreciate the interest Dr. Jantzen and his colleagues have shown in our report and in the relation between neuromuscular blocking agents and intraocular pressure (IOP) changes. Unfortunately, they seem to have missed our main point, which is that succinylcholine should not be avoided in open eye injuries solely because of the possibility of a mild elevation in IOP when more vital factors must be considered. For example, a full stomach may dictate the need for rapid intubation to prevent aspiration. Coughing or staining must be avoided during intubation to prevent an even greater rise in IOP than that produced by succinylcholine.

As Dr. Jantzen points out, succinylcholine raises the IOP in the intact eye. However, there is doubt that it increases pressure under deep anesthesia. His references are Murphy, who nowhere in his article makes this statement, and fig 1, which is apparently a single experiment in a dog under fentanyl anesthesia. If Dr. Jantzen intends to cite Cook's work as the basis for this statement, those patients were given less than 1 MAC halothane, hardly deep anesthesia. Furthermore, it has not been proved, and we think it doubtful, that the same mechanisms operate in the injured eye. We thank Dr. Jantzen for calling attention to our error in citation about alcuronium in place of atracurium.

Finally, we concur with the conclusion of the recent review article cited by Dr. Jantzen, "There is, as yet, no ultrarapidly acting nondepolarizing neuromuscular blocking agent to allow succinylcholine to be abandoned completely and no method of succinylcholine pretreatment is completely effective. For such surgery the anesthesiologist must balance the overall risk to the patient with the risk to the injured eye, in deciding if succinylcholine is to be used."[1]

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REFERENCE

1. Murphy DF: Anesthesia and intraocular pressure. Anesth Analg 64:520–528, 1985

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Succinylcholine and Open Eye Injury. II.

To The Editor:—I wish to commend Libonati *et al.*[1] for their recent clinical report documenting the safe use of succinylcholine in open eye surgery. My experience here at the Massachusetts Eye and Ear Infirmary is similar to the data presented for the Wills Eye Hospital.

Pretreatment with a nondepolarizing muscle relaxant, use of intravenous lidocaine, and assurance of adequate depth of anesthesia prior to intubation have allowed the use of succinylcholine for full-stomach–open-eye situations without causing further eye damage. The Massachusetts Eye and Ear Infirmary treats several hundred open eye injuries each year, and the majority are intubated as de-