THE EFFECT OF LIDOCAINE ON SUCCINYLCHOLINE-INDUCED RISE IN INTRAOCULAR PRESSURE

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Pretreatment of patients with intravenous lidocaine has been shown to reduce the frequency, intensity and duration of muscle pain following succinylcholine administration.[1,2] The purpose of this study was to determine if lidocaine given intravenously before succinylcholine would reduce or prevent the increase of intraocular pressure frequently observed following administration of succinylcholine.

Method

Twenty-nine healthy patients ranging in age from 6 to 85 years who were undergoing minor head and neck operations were studied. Using random selection, eight patients received lidocaine 1 $mg \cdot kg^{-1}$, ten patients received lidocaine 2 $mg \cdot kg^{-1}$, and ten patients succinylcholine alone, constituting the control group. Pressures were measured in both eyes except for patients with pathology in one eye.

Anaesthesia was induced in all patients with thiopentone 5 $mg \cdot kg^{-1}$. The two test groups received intravenous lidocaine 1 $mg \cdot kg^{-1}$ and 2 $mg \cdot kg^{-1}$ respectively one minute before succinylcholine 1.5 $mg \cdot kg^{-1}$, which was used to facilitate tracheal intubation. Anaesthesia was maintained with nitrous oxide 50 per cent with oxygen and halothane 1.0 to 1.5 per cent.

Heart rate, blood pressure and electrocardiogram were monitored in all patients. Intraocular pressure was monitored with a Schiotz tonometer using a 5.5 g weight. Measurements were made after the administration of the thiopentone and then every minute for five to ten minutes following the administration of lidocaine and succinylcholine followed by tracheal intubation in the test groups, and following the administration of succinylcholine and tracheal intubation in the control group.

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Results

The intraocular pressure of the three groups are compared in the Figure.

In all groups the increase in intraocular pressure was statistically significant between the pre-intubation reading and the first post-intubation reading. There was no statistically significant difference in the rise in intraocular pressure between the three groups.

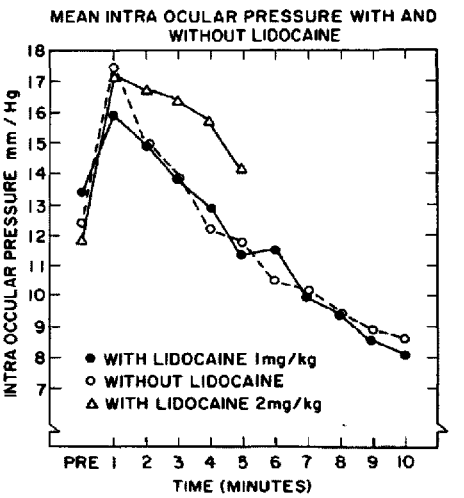

Figure 1 Comparison of mean intraocular pressure changes following succinylcholine.

Discussion

Succinylcholine and/or tracheal intubation has been shown by many investigators to cause a rise in intraocular pressure.[3-6] This rise in pressure has been modified by pretreatment with hexaflurenium,[7] gallamine,[8] d-turbocurarine[8] and acetazolamide.[9] The most important causative factor is considered to be contraction of the extraocular muscles. However, there is evidence

that there may be additional or alternative causes.[10]

Usubiaga, *et al.*[1] reported a reduction of frequency, intensity and duration of postoperative muscle pain by administration of lidocaine before succinylcholine 6 mg·kg^{-1}. More recently Sharm[2] reported a reduction of incidence of muscle pain following administration of lidocaine 40 mg to adults before succinylcholine. The difference in the doses of lidocaine used in these two studies is great. It is interesting to note that doses similar to those used in the study of Usubiaga, *et al.*[1] (6 mg·kg^{-1}) were found by Miller, *et al.*[11] to reduce the rise in intragastric pressure caused by succinylcholine.

It is possible that larger doses of lidocaine, such as 6 mg·kg^{-1} may have some effect in reducing the rise in intraocular pressure following succinylcholine administration. However, even if this were the case, it would probably not have any advantage over pretreatment with d-turbocurarine and, in fact, the large dose of lidocaine may be hazardous.

The observed difference in intraocular pressure between eyes of a patient has been reported by Davanager and, therefore, does not solely reflect in the tonometric technique.[12]

In conclusion, a conservative dose of lidocaine 1 to 2 mg·kg^{-1} appears to be ineffective in preventing the rise in intraocular pressure following succinylcholine and/or tracheal intubation.

Summary

The effect of lidocaine on the increase of intraocular pressure induced by succinylcholine was studied in patients 6 to 85 years of age. Three groups of patients were studied. One group of eight patients received lidocaine 1 mg·kg^{-1} before succinylcholine and a control group of ten patients did not have lidocaine. Anaesthesia was induced with thiopentone 5 mg·kg^{-1} and maintained with nitrous oxide 50 per cent with oxygen and halothane 1.0–1.5 per cent. The tracheae of all patients were intubated.

Lidocaine in doses of 1.0 to 2.0 mg·kg^{-1} did not prevent transient rise in intraocular pressure following administration of succinylcholine and tracheal intubation.

Résumé

L'étude porte sur trois groupes de patients et évalue l'effet de l'injection de lidocaïne sur l'augmentation de la tension intraoculaire déclenchée par la succinylcholine. Un premier groupe de huit patients a reçu lidocaïne 1 mg·kg^{-1} avant la succinylcholine, un deuxième de dix patients, lidocaïne 2 mg·kg^{-1} avant la succinylcholine, et un troisième de dix patients n'a reçu que la succinylcholine et a servi de contrôle. L'anesthésie fut réalisée avec du thiopental 5 mg·kg^{-1} suivi de protoxyde d'azote-oxygène à 50 pour cent avec halothane 1.0 à 1.5 pour cent. Tous les patients furent intubés.

La lidocaïne aux doses de 1.0 à 2.0 mg·kg^{-1} n'a pas empêché l'augmentation transitoire de la tension intraoculaire provoquée par l'administration de succinylcholine et l'intubation trachéale.

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