ECOTHIOPATE IODIDE EYE DROPS AND PROLONGED RESPONSE TO SUXAMETHONIUM

A Case Report

BY

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SUMMARY

A case is presented in which an extended response to suxamethonium was seen in a patient receiving ecothiopate iodide eye drops. It is important for the anaesthetist to determine the nature of eye drops used by patients about to undergo anaesthesia during which suxamethonium might be given. This muscle relaxant should be administered cautiously to patients who have received ecothiopate iodide eye drops within several weeks prior to the time of anaesthesia.

Suxamethonium is a skeletal muscle relaxant whose short duration of action is due to its rapid destruction by the enzyme pseudocholinesterase. Any factor which substantially reduces pseudocholinesterase activity may impair the metabolism of suxamethonium sufficiently to result in a prolongation of its effect (Kalow and Gunn, 1957; Foldes et al., 1956). The purpose of this report is to draw the attention of anaesthetists to the marked decrease in pseudocholinesterase activity that may occur in patients treated with ecothiopate iodide eye drops (Leopold, Krishna and Lehman, 1959; de Roetth et al., 1965; McGavin, 1965).

Ecothiopate iodide is a potent, long-acting cholinesterase inhibitor which has been extensively used for the past five years in the treatment of glaucoma. It is administered only by local instillation into the conjunctival sac. When introduced into the eye it produces an intense and prolonged myosis. In addition to the local effect in the eye, there is systemic absorption which is sufficient to produce a considerable decrease in pseudocholinesterase activity (Leopold, Krishna and Lehman, 1959; de Roetth et al., 1965; McGavin, 1965). Ecothiopate iodide is a potent, long-acting cholinesterase inhibitor which has been extensively used for the past five years in the treatment of glaucoma. It is administered only by local instillation into the conjunctival sac. When introduced into the eye it produces an intense and prolonged myosis. In addition to the local effect in the eye, there is systemic absorption which is sufficient to produce a considerable decrease in pseudocholinesterase activity (Leopold, Krishna and Lehman, 1959; de Roetth et al., 1965; McGavin, 1965).

The fall in enzyme activity is rapid during the first two weeks after the commencement of treatment and is more gradual thereafter (de Roetth et al., 1965). Levels of less than 5 per cent of normal activity have been reported in patients who have been receiving ecothiopate iodide eye drops for a prolonged period of time (de Roetth et al., 1965). Following the cessation of prolonged ecothiopate iodide therapy, it takes about four weeks for the depressed pseudocholinesterase level to approximate normal values (de Roetth et al., 1965).

McGavin speculated that patients receiving ecothiopate iodide eye drops might show prolonged apnoea following the administration of suxamethonium because of pseudocholinesterase depression (McGavin, 1965). The following case report illustrates this complication.

CASE REPORT

The patient, a healthy, 85-pound, 12-year-old male with congenital glaucoma was admitted for cryocautery of the left eye. Quinalbarbitone 75 mg, morphine sulphate 5 mg, and hyoscine 0.3 mg were given intramuscularly 1 hour prior to the start of anaesthesia. Anaesthesia was induced only by local instillation into the conjunctival sac. When introduced into the eye it produces an intense and prolonged myosis. In addition to the local effect in the eye, there is systemic absorption which is sufficient to produce a considerable decrease in pseudocholinesterase activity (Leopold, Krishna and Lehman, 1959; de Roetth et al., 1965; McGavin, 1965). The fall in enzyme activity is rapid during the first two weeks after the commencement of treatment and is more gradual thereafter (de Roetth et al., 1965). Levels of less than 5 per cent of normal activity have been reported in patients who have been receiving ecothiopate iodide eye drops for a prolonged period of time (de Roetth et al., 1965). Following the cessation of prolonged ecothiopate iodide therapy, it takes about four weeks for the depressed pseudocholinesterase level to approximate normal values (de Roetth et al., 1965).

McGavin speculated that patients receiving ecothiopate iodide eye drops might show prolonged apnoea following the administration of suxamethonium because of pseudocholinesterase depression (McGavin, 1965). The following case report illustrates this complication.

The patient, a healthy, 85-pound, 12-year-old male with congenital glaucoma was admitted for cryocautery of the left eye. Quinalbarbitone 75 mg, morphine sulphate 5 mg, and hyoscine 0.3 mg were given intramuscularly 1 hour prior to the start of anaesthesia. Anaesthesia was induced with 75 mg of intravenous thiopentone (2.5 per cent). Suxamethonium 40 mg was given intravenously to facilitate endotracheal intubation. Anaesthesia was maintained using a semiclosed absorption system with nitrous oxide 3 l./min, oxygen 2 l./min, and halothane 1 per cent administered from a Vernitrol vaporizer outside the circuit. Controlled respiration was used after intubation.

After approximately 5 minutes, the halothane concentration was decreased to 0.8 per cent and attempts were begun to re-establish spontaneous respiration. No respiratory effort was seen for 10 minutes, at which time weak diaphragmatic activity and tracheal tug began. During the next 10 minutes, respiration gradually returned to normal. Forty-five minutes after the induction of anaesthesia, the operation was completed and halothane was discontinued. Fifteen minutes later, a nerve stimulator was applied to the forearm and wrist. The mechanical response to ulnar
nerve stimulation at the wrist indicated that neuromuscular transmission was intact.

The patient was then given 20 mg of suxamethonium intravenously. The muscle response to ulnar nerve stimulation disappeared completely and could not be elicited for 10 minutes. It gradually returned to the initially observed height during the next 5 minutes.

Because of his extended response to this dose of suxamethonium, the patient's pseudocholinesterase activity was measured by the method of Kalow (Kalow and Lindsay, 1955) and was found to be 26.6 units, about 30 per cent of normal (mean value for normal males $86.8 \pm 5.2$). The dibucaine number was 75 (normal 69-77) and the fluoride number was 71 (normal 60-71). Investigation of the genetic history revealed that both parents had normal pseudocholinesterase activity and normal dibucaine and fluoride numbers. These findings ruled out the possibility that the patient's serum contained any of the known abnormal variants of pseudocholinesterase.

Further inquiry revealed that the patient was being treated with ecothiopate iodide eye drops. He had used one drop of 0.125 per cent in each eye twice a day for nine months. During this time he received no other cholinesterase inhibiting agent.

The patient's ophthalmic condition requires that the ecothiopate iodide therapy be continued. If this therapy is interrupted at any time, samples of his serum will be obtained to determine reactivation of pseudocholinesterase.

It is important for the anaesthetist, during his pre-operative visit, to inquire about the recent use of eye drops by patients about to undergo anaesthesia during which suxamethonium might be used. Suxamethonium should be administered cautiously to patients who have received ecothiopate iodide eye drops within several weeks prior to the time of anaesthesia since they may have a reduction in pseudocholinesterase activity sufficient to impair the metabolism of this relaxant and result in a prolongation of its effect.

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REFERENCES


