THIOPENTONE-SUXAMETHONIUM MIXTURE

A Method for Reducing the Aspiration Hazard during Induction of Anaesthesia

BY

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SUMMARY

Injection of a thiopentone-suxamethonium mixture is a safe method for rapid intubation in cases where the risk of regurgitation is high. It shortens the period between the onset of unconsciousness and endotracheal intubation. With the technique described the likelihood of awareness of fasciculations is very small. It forms a useful addition to the techniques available for dealing with a patient having a full stomach and it can be combined with other methods of reducing the risk of aspiration during induction of anaesthesia.

Despite the wide variety of techniques advocated for the prevention of aspiration of stomach contents during general anaesthesia, this problem continues to be a major hazard (Clifton and Hotten, 1963; Dinnick, 1964; Gray, 1968). Regurgitation occurs often at or soon after induction and is most dangerous during the period when the patient is unconscious but is not intubated. It is reasonable, therefore, to hasten induction and endotracheal intubation, and thereby to shorten the high risk period. It was to this end that Davies (1963) used a mixture of thiopentone and suxamethonium, arguing that, if unconsciousness and fasciculations occurred simultaneously, then the patient would be unaware of the fasciculations, and conditions suitable for early intubation would be present. He concluded that his technique was unsuitable because of the unacceptably large number of patients who were aware of suxamethonium fasciculations. The present paper is a study of the patient acceptability of the technique with body weight related dosage of thiopentone and suxamethonium.

MATERIAL AND METHOD

In 100 adult patients, including 26 emergency cases anaesthesia was induced with a mixture of thiopentone and suxamethonium as described below. Patients for elective surgery received morphine 1 mg/stone (6.36 kg) body weight and atropine 0.6 mg by intramuscular injection about 1 hour before induction. In patients for emergency surgery, in whom there was a risk of regurgitation and aspiration of gastric contents, a Ryle tube or oesophageal tube was used as necessary and premedication consisted of atropine alone.

Anaesthesia was induced with thiopentone sodium (2.5 per cent solution) and suxamethonium chloride (5 per cent solution) in a dose of 4 mg/kg body weight and 1 mg/kg body weight respectively, rounded off to the next higher 10 mg for thiopentone and the nearest 5 mg for suxamethonium. Before injection the appropriate dose of suxamethonium was drawn into the syringe containing thiopentone.

The lungs were inflated with oxygen and topical analgesia of the cords carried out with 4 per cent lignocaine solution before endotracheal intubation. In emergency cases the patients were pre-oxygenated but topical analgesia was omitted, intubation being performed as soon as the patient was sufficiently relaxed. Cricoid pressure (Sellick, 1961) was used to reduce further the risk of regurgitation.

Note was made of whether sleep or fasciculations occurred first, and of the time taken to complete endotracheal intubation. On the next day patients were asked the following questions:

(a) “Do you remember the injection?”
(b) “Do you remember going off to sleep?”
(c) “Do you remember anything else about the induction?”
(d) “Was the induction pleasant?”

If the answer to question (c) was negative, then a specific inquiry was made as to whether the patient had felt any fluttering sensation in the face or in any other part of the body.

RESULTS

Forty-five cases were judged to be asleep before the onset of fasciculations. In the other 55 cases fasciculations occurred before or simultaneously with the onset of sleep.

On being questioned about the induction, 21 patients did not remember the injection given at induction and another 7 were vague about the injection site. Despite the onset of fasciculations before or simultaneously with the onset of sleep in 55 per cent cases, only one patient regarded the induction as unpleasant because he had felt his facial muscles being “drawn tight” just before going to sleep. Two other patients were aware of fasciculations but did not regard the sensation as unpleasant. In fact, it was only in response to a direct inquiry that they remembered feeling a fluttering sensation in the face before going to sleep.

Intubation was completed in the emergency cases in 60–65 seconds in most instances. No regurgitation or aspiration occurred in any case.

DISCUSSION

When thiopentone and suxamethonium are used to induce anaesthesia the patient with a full stomach can be considered to be at risk from regurgitation and aspiration from the moment of unconsciousness. With endotracheal intubation and inflation of the cuff this risk is virtually eliminated. With the conventional method of using thiopentone and suxamethonium, the duration of this period between the onset of unconsciousness and endotracheal intubation is about 50 seconds. When the mixture is used this high-risk period is considerably shortened. Thus, the patient becomes unconscious and fasciculating in about 20 seconds after the injection, and endotracheal intubation can be completed, in most cases, in a further 20 seconds and should regurgitation occur during laryngoscopy the situation can be brought under control by suction, hastening intubation, etc. The period of the greatest risk is, therefore, reduced from about 50 seconds to the 20 seconds period during which the patient is unconscious and fasciculating but the jaw is not relaxed. By thus shortening the danger period during which the patient is unconscious but not relaxed, this technique is likely to increase patient safety. It may be combined, as in this series, with other measures to reduce the chances of regurgitation and aspiration such as pre-oxygenation and cricoid pressure. Although no instance of regurgitation occurred in the present cases, a much larger series would be required for a full clinical assessment of the technique.

With the dosages of thiopentone and suxamethonium used, the chance of unpleasant awareness of fasciculations is low. In this series, 1 patient out of 100 regarded the induction as unpleasant. It was found later that this patient was a heavy drinker, and, in retrospect, a dose of thiopentone of 4 mg/kg body weight was considered to be too low for him. In patients where there is a high risk of regurgitation and aspiration, and where rapid intubation is desirable, the small chance of an unpleasant induction is acceptable.

Davies (1963) using a similar mixture found a higher incidence unpleasant memory of fasciculations—8 patients out of 150 (5.3 per cent). A possible explanation for the difference may be that Davies did not correlate dosage to body weight. He used either a “suitable” dose of a mixture containing thiopentone 250 mg and suxamethonium 100 mg or a “suitable” dose of thiopentone and combined this with suxamethonium 100 mg. In the present study the proportion of suxamethonium to thiopentone is lower (1:4) but adequate for good relaxation.

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REFERENCES

BOOK REVIEW


The fact that the second edition of this book has been published only two years after the original publication suggests that there has been a considerable demand for this manual. This is no doubt a reflection of the extent of organized inhalation therapy departments in hospitals in the United States of America. Indeed it is salutary to learn that since the first edition of this book was written, the Department of Inhalation Therapy at the University Hospital, University of Michigan, has developed from ten inhalation therapists to a group of thirty inhalation therapists.

The new edition has been brought up to date by the inclusion of details of newer nebulizers and ventilators and the deletion of some equipment which is now considered to be obsolete. The section on drugs used in inhalation therapy has been completely rewritten and represents a considerable improvement on the previous catalogue of drug preparations. A new section is devoted to general patient rounds which are intended to supervise continuity of patient and equipment care and to maintain rapport with the patient, nurse and physician. Some modifications have been incorporated into the sections on form keeping and sterilization.

It is essential to realize, as the authors' foreword states, that this manual is not intended to be a general textbook on inhalation therapy, but is a description of equipment and techniques used at the University of Michigan. The value of such a manual can therefore only be thoroughly appreciated in those institutions which possess an inhalation therapy department. However, there are a sufficient number of practical hints about inhalation therapy equipment in this book to inform and interest all those responsible for such apparatus.

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