

# Reduction of the Aspiration Hazard in Anaesthesia: Use of Methohexitone-Suxamethonium Mixtures

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ONE OF THE CONSTANTLY recurring problems facing anaesthetists is the patient with a full stomach. The risk of anaesthesia in such a patient is considerably enhanced by the possibility of the patient vomiting or regurgitating the stomach contents and aspirating these into the lungs.

Aspiration continues to be a major cause of morbidity and mortality due to anaesthesia (Edwards et al., 1956; Kinch, 1959; Clifton and Hotten, 1963; Gray, 1968), although it is a problem which is to a large extent preventable (Vandam, 1965). Aspiration is most common during the induction of anaesthesia (Lock and Griess, 1955) and is likely to produce its most deleterious effects during this period (Parker 1954). Consideration should, therefore, be given to the possible ways of preventing such aspiration during the period of anaesthesia induction prior to the introduction of a cuffed endotracheal tube (Mucklow and Larard, 1963).

Khawaja (1971) showed that a possible way of shortening this high-risk period and thus reducing the aspiration risk is by use of thiopentone-suxamethonium mixtures to induce anaesthesia. When a mixture containing thiopentone and suxamethonium in a dosage of 4 mg/kg body weight and 1 mg/kg body weight respectively was injected, the patient was unlikely to be aware of the suxamethonium fasciculations and the interval between the

onset of unconsciousness and completion of endotracheal intubation was materially shortened.

Methohexitone affects the cardiovascular system much less than does thiopentone (Weyl, Unal and Alper, 1958; Coleman and Green, 1960; Dundee and Moore, 1961) and provides more rapid recovery (Taylor and Stoelting, 1960; Elliott et al., 1962; Swerdlow, 1964) and induction with the former drug may be preferable, at least in some cases. A study was, therefore, undertaken to assess the suitability of methohexitone-suxamethonium mixtures in the induction of anaesthesia. The present paper is a preliminary report of its use in 70 patients.

## Material

Seventy adult patients, including 18 emergency cases, suitable for induction with methohexitone and suxamethonium as described below, were studied. The average age of the patients was 32.7 years (range 18 years to 61 years) and the average body weight was 50.7 kg (range 35.5 kg to 83.0 kg). The patients belonged in the first three grades, or the emergency counterparts, of the American Society of Anaesthesiologists classification of physical status.

Patients for elective surgery were premedicated with morphine sulphate 1 mg/stone (6.36 kg) body weight and atropine sulphate 0.6 mg injected intramuscularly about one hour before induction. In

patients for emergency surgery, where there was a risk of regurgitation and aspiration, atropine alone was given (Clark and Riddoch, 1962; Inkster, 1963; Wylie, 1963). Where necessary, a Levine tube or oesophageal tube was also used to empty the stomach as far as possible and to reduce the intragastric pressure. Narcotic premedication was also omitted in patients, whether elective or emergency, presenting for Caesarean section.

Mendelson (1946) and Dinnick (1957) suggested that obstetrical patients requiring a general anaesthetic be given oral antacids to reduce the acidity of the gastric contents. Most of such patients in this series received a 15 ml dose of magnesium trisilicate mixture (B.P.C.), which Taylor and Pryse-Davies (1963) showed was more effective than the aluminium hydroxide used by Crawford (1962).

### Method

Anaesthesia was induced with methohexitone and suxamethonium. The dose of methohexitone, for the first 40 patients, was from 1.0 mg to 1.3 mg/kg body weight (average 1.21 mg/kg body weight) depending on the fitness of the patient. For the rest of the series a somewhat larger dose of methohexitone was used, the maximum being 1.5 mg/kg body weight and the average 1.42 mg/kg body weight. The reason for the increase is discussed below. The dose of suxamethonium was 1 mg/kg body weight to the nearest 5 mg and limited to a maximum of 50 mg. Just before injection, the appropriate dose of suxamethonium, previously measured out in a separate syringe, was drawn into the syringe containing methohexitone.

Endotracheal intubation was then performed in the usual manner after oxygenating the patient and spraying the larynx with 4% lignocaine. In obstetrical patients and patients for emergency surgery, the risk of regurgitation and aspiration was further reduced by preoxygenating the patients, using cricoid pressure (Sellick, 1961), omitting topical laryngeal anaesthesia and intubating the patients as soon as the jaw was sufficiently relaxed. The time interval between the beginning of the injection of the mixture and completion of endotracheal intubation was recorded, using a stop-watch.

The next day, patients were questioned to determine whether they considered the induction of anaesthesia pleasant or not. They were also questioned to determine whether they had been aware of fasciculations or any tenseness in the facial or other muscles.

### Results

None of the seventy patients regarded the induction as unpleasant. Two patients had had anaesthetics previously. One of these, who had had an inhalational induction, considered the present induction to be more pleasant. In the other case, where anaesthesia had previously been induced by the intravenous route, the patient did not consider the second induction to be any different.

One patient who presented for a Caesarean section mentioned that she had felt a tightness in the jaw muscles just before going off to sleep. When asked directly whether they had felt tightness or a fluttering sensation in the facial or other muscles, three patients remembered that they had indeed felt such a tightness — in the face in two instances and in the left thigh muscles in one case. These four patients had received doses of methohexitone of about 1.2 mg/kg body weight and two had not received any sedative pre-medication. None of them, however, considered the induction in any way unpleasant. These patients belonged to the first group of forty patients. When the dose of methohexitone was increased in the second group of thirty patients, there was no case of awareness of fasciculations, and all the patients regarded the induction as pleasant.

In the emergency cases, where patients were preoxygenated, laryngoscopy could be started some 15 — 20 seconds after the onset of unconsciousness and intubation completed, in most instances, in well under 60 seconds. There was no instance of regurgitation or aspiration.

### Discussion

When a barbiturate-suxamethonium sequence is used in the conventional manner in a patient with a full stomach, the high-risk period between the onset of unconsciousness and completion of endotracheal intubation, during which regurgitation is most likely and most harmful, is about 50 seconds. If the syringe containing suxamethonium is accidentally dropped or the needle in the vein gets displaced, this period will be much prolonged.

Khawaja (1971) showed that by using a thio-pentone-suxamethonium mixture, the danger period is reduced to about 20 seconds. This shortening of the danger period, when the patient is unconscious but not relaxed, is likely to make induction safer, particularly in patients who are especially liable to regurgitate, such as obstetrical cases, patients with intestinal obstruction, etc. The use of methohexitone-suxamethonium mixtures shortens the danger period

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to a similar extent and, hence, makes induction of anaesthesia safer. The risks inherent in the giving of two injections are avoided.

It appears from the results of the present study, the patient acceptability of the methohexitone-suxamethonium mixture is likely to be as high as that of the conventional method where the drugs are injected separately or of the thiopentone-suxamethonium mixture. When used in the lower dosage, four patients out of 40 (10%) were aware of suxamethonium fasciculations, although none of them considered the experience unpleasant. When a higher dose of methohexitone, about 1.5 mg/kg body weight, was used, none of 30 patients was aware of any fasciculations. It is, therefore, concluded that this higher dosage is preferable, except where the physical status of the patient makes a smaller dose desirable. Further evaluation of the technique is in progress.

The technique may be combined with other methods of reducing the chance of regurgitation, such as the use of a stomach tube, cricoid pressure and preoxygenation, and of rendering aspiration less

harmful, such as the preanaesthetic use of alkalis in obstetrical patients.

### Summary

Induction of anaesthesia with methohexitone-suxamethonium mixtures, as described, is a safe method for rapid intubation in patients who may have a full stomach. The period between the onset of unconsciousness and endotracheal intubation is considerably shorter than with the conventional technique. This technique may be combined with other methods of reducing the aspiration risk. When the smaller dose of methohexitone is used, there is a chance of awareness of fasciculations, but, in this series, no patient considered the induction to be unpleasant. When a dose of methohexitone of 1.5 mg/kg body weight is used awareness of fasciculations is unlikely.

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