CORRESPONDENCE

COMBINATION OF FENTANYL, ETOMIDATE AND VECURONIUM MAY CAUSE SEVERE VAGOTONIC STATE

Sir,—Recent clinical reports have suggested that there may be a possible contribution of vecuronium to bradycardia and arrhythmias (May, 1985; Milligan and Beers, 1985; Clayton, 1986; Pollok, 1986).

According to these reports, this kind of arrhythmia occurs in combination with the administration of vecuronium, mainly at the time of severe vagal stimulation such as manipulation of the peritoneum. It does not usually occur immediately after the induction of anaesthesia. Exceptions are the cases reported by Starr, Sethna and Estafanous (1986) in which the injection of vecuronium was combined with the rapid administration of large doses of sufentanil and caused asystole before intubation of during laryngoscopy.

According to our experience, asystole or severe bradycardia can occur even with light vagal stimulation and without large doses of opioid when vecuronium is administered together with etomidate and a small dose of fentanyl.

Out of 849 cases in which anaesthesia was induced with a small dose of fentanyl (0.003-0.004 mg kg\(^{-1}\)), etomidate (0.3-0.4 mg kg\(^{-1}\)) and vecuronium (0.1-0.12 mg kg\(^{-1}\)), we saw two cases of extreme bradycardia (less than 40 beat min\(^{-1}\)) before intubation, one while spraying lignocaine onto the patient's tongue and another during mask ventilation with oxygen. On occasions we saw extreme bradycardia or asystole during intubation (five patients), intraoral manipulation (one patient case) such as the insertion of fingers to the pharynx to aid the passage of a nasogastric tube, or through irritation of a nostril with a nasogastric tube (one patient).

These arrhythmias were relatively harmless, however, because in all of the above cases, the heart rate returned relatively quickly to greater than 40 beat min\(^{-1}\) when the manipulation was stopped and precordial thumps were given. In some instances atropine was injected. Our patients (mostly cardiac patients) are usually premedicated with diazepam 10 mg by mouth and morphine sulphate 0.15 mg kg\(^{-1}\) i.m., 1 h before the induction of anaesthesia. No atropine is given.

We could not find any definite correlation between specific cardiac diseases or preoperative medication and the occurrence of severe bradycardia or asystole. Arrhythmia occurred in patients with coronary artery disease as well as aortic or mitral valve disease. Some, but not all, patients were receiving β-blockers, digitalis or calcium antagonist before operation. It is particularly noteworthy that this kind of arrhythmia has so far never occurred when thiopentone 3-4 mg kg\(^{-1}\) or methohexitone 1-2 mg kg\(^{-1}\) was used, nor has it happened when pancuronium was substituted for vecuronium.

The possible mechanism for the haemodynamic differences between etomidate and barbiturate or between vecuronium and pancuronium is to be sought in their effects on vagal tone. In animal experiments, barbiturates have been shown to inhibit vagal activity, whereas etomidate was seen to have minimal effects or occasionally increase vagal activity (Inoue and Arndt, 1982). Pancuronium, but not vecuronium, has a vagolytic effect (Durant et al., 1979). Futhermore, it is tempting to speculate that vecuronium may contribute positively to the vagotonic response because vecuronium was shown to decrease heart rate in fentanyl anaesthesia (Salmenperä et al., 1983). Thus, when thiopentone, methohexitone or pancuronium is used, the vagomimetic effects of fentanyl are countered, but if this is not the case and the vagomimetic effects of fentanyl are enhanced by another agent, severe vagotonic reactions may result.

Vecuronium, which does not have autonomic or vagolytic effects, may be used to advantage, but its non-vagolytic effects may prove to be disadvantageous, as was shown in the patients of Starr, Sethna and Estafanous (1986) and in our patients. When one chooses to administer vecuronium to facilitate intubation one should take the combined use of vagolytic agents into consideration.

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REFERENCES


A NEW DESIGN OF INTUBATING FORCEPS

Sir,—Nasotracheal intubation is often selected in paediatric patients—particularly infants requiring ventilatory support—in a wide variety of “medical” conditions and commonly in relation to major surgery.

Some paediatric units do not usually use the nasal route because of supposed technical difficulties. Supporters of the nasal route feel that the tracheal tube is more stable and secure,
with less adhesive tape on the face; it also simplifies nursing care procedures.

The usual practice in nasotracheal intubation is to use Magill's forceps (which grip the tracheal tube from side to side), to lift the tip of the tracheal tube forward and to advance it into the laryngeal introitus, when it can be pushed on down the trachea.

It sometimes happens in adults, but more often in children...
in whom the larynx lies higher in the neck, that the tracheal tube will not run down the trachea. The usual remedy is, after removing the laryngoscope and forceps, to lift the head, flexing it on the neck, thus bringing the distal part of the tracheal tube more into line with the axis of the trachea, which runs downwards and posteriorly at an angle of 15°. The tube can usually then be pushed down. This manoeuvre is not under direct vision; sometimes the tracheal tube slips out of the laryngeal inlet and then it is the oesophagus that is intubated. The time that is taken to realize this error and reapply the mask may be critical in some very ill, or very cyanosed babies.

A new design of forceps has been made (fig. 1) in which two “teeth” protrude to the left and can grip the tracheal tube in front and behind. The teeth are so placed that closing the handles bends the tracheal tube backwards (fig. 2), and they are curved so that no size of tracheal tube will be flattened or kinked. The forceps are designed to be used in the sagittal plane.

In practice, the tracheal tube is pushed well down the pharynx and is grasped by rotating the forceps to hook the posterior tooth behind the tracheal tube. Care must be taken to avoid the uvula, a nasogastric tube or placing the posterior tooth into the side hole of the tracheal tube. The tracheal tube is lifted forward and the handles closed sufficiently to bend it backwards so that it can be advanced through the larynx under direct vision. The tracheal tube can then be fed through the larynx with the forceps, or an assistant can press the tube further in.

Apart from engaging the side hole of the tracheal tube which is very difficult to see, the writer has had no difficulties and no complications at all during many years use of the prototype instrument at the Royal Hospital for Sick Children, Edinburgh. These forceps facilitate intubation in critically ill babies, the whole process being extremely rapid and under direct vision. Oesophageal intubation is has not occurred.

The forceps can be used with all sizes of tracheal tube up to 6 mm bore. They are available from Northern Hospital Supplies Spylaw Street, Colinton, Edinburgh EH13 OJT.

R. BURTLES
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RECOVERY AFTER ATRACURIUM

Sir,—A paper on the infusion of atracurium published in your journal (Sneyd, 1986) prompts me to make a plea for the routine use of anticholinesterase drugs after the infusion of non-depolarizing neuromuscular blocking drugs. Pharmacological antagonism was not used in 14 of the 15 patients studied, presumably because these patients "showed a normal clinical recovery" (Eagar, Flynn and Hughes, 1984). Of these, only one is fully compared they used similar infusion rates (0.37 mg kg⁻¹ h⁻¹ compared with 0.3 mg kg⁻¹ h⁻¹), and as spontaneous recovery rates from short infusions may not be significantly different from those receiving long infusions (Savarese et al., 1986), it is possible that Sneyd’s patients had a small degree of residual paralysis which was not detectable with the methods he used. Patients who have received a small amounts of non-depolarizing neuromuscular blockers, and have small degrees of impairment of neuromuscular function, may experience unpleasant sensations associated with the use of the blocking drug (Howard-Hansen et al., 1980; Engbaek et al., 1985).

Although clinical assessment of the adequacy of ventilation is judged satisfactory, patients who have received infusions of neuromuscular blocking drugs and in whom antagonism of paralysis is assessed by the clinical observation of the train-of-four response to peripheral nerve stimulation may, therefore, have sufficient residual paralysis to give rise to unpleasant subjective sensations in the post-operative period. I would, therefore, suggest that such patients should be given an anticholinesterase to prevent this.

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REFERENCES


Sir,—Your correspondent ignores the fact that the patients were tested with 50 Hz as well as a train-of-four. Assessment of tetanic response is easy and, in comparison with train-of-four “Sustained tetanic response must be regarded as more physiological and provides a more accurate indication of clinical recovery” (Eagar, Flynn and Hughes, 1984).

The average figure of 42 min for spontaneous recovery was based upon five patients who received a higher rate of infusion for a longer period than in my study. Of these, only one is fully documented; this patient was demonstrated to have a sustained