was reintroduced with ease, and the arterial pressure returned to its former value. Examination of the discarded tube and connector revealed that a plastic spigot from the air seal of the face mask was wedged in the corrugations of the catheter mount in such a manner that a one-way valve effect was produced.

Inflation of the chest was possible, but expiration was not. The subsequent increase in intrathoracic pressure was clearly responsible for a decrease in venous return and decreases in cardiac output and arterial pressure. Similar effects have been reported by Mason and Tackley (1981) in the Intensive Care Unit when exhaled blood caused a blockage of the expiratory filter on a Cape ventilator.

Checking equipment before use should be mandatory. Boulton (1982) has suggested passing an introducer or bougie through endotracheal tubes before use, as is common practice in North America. However, in this case the obstruction would only have been revealed had the bougie passed through the catheter mount as well.

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J. M. MILLAR

REFERENCES

SIMPLE ATRACURIUM INFUSIONS

Sir,—In most surgical operations requiring the use of neuromuscular blocking agents, satisfactory muscle relaxation is maintained by incremental doses without the use of a peripheral nerve stimulator. When using atracurium, relaxation wears off rapidly once it starts to do so, and incremental doses—which may be required at 15–20 min intervals—must be given immediately to maintain smooth operating conditions.

Eager, Flynn and Hughes (1984) have shown that atracurium infusions can be used successfully for long surgical procedures using sophisticated equipment for peripheral nerve stimulation and for monitoring neuromuscular blockade. As such equipment may not be available in many hospitals, 55 patients whose operations were expected to last at least 90 min received an atracurium infusion, neuromuscular blockade being monitored using a hand-held peripheral nerve stimulator (Isleworth Electronics) in seven patients and on purely clinical grounds in the remainder. Seventeen of the patients were older than 70 years, 18 were ASA grade 3, three were ASA grade 4 and one was ASA grade 5. A bolus dose of atracurium 0.5–0.6 mg kg⁻¹ was given to facilitate tracheal intubation; an infusion i.v. of atracurium 0.5 mg ml⁻¹ in 0.9% sodium chloride B.P. using a Grazeby Dynamics M.S. 16 syringe driver in the remainder.

The infusion was commenced at a rate of 0.4 mg kg⁻¹ h⁻¹ approximately 20–30 min after the start of the anaesthetic, as atracurium has a half-life of about 25 min, and was increased or decreased, as required, and discontinued at closure of the peritoneum in patients undergoing intra-abdominal surgery and at an estimated 15 min before the end of the operation in the others. All patients received droperidol 5 mg and fentanyl 0.1–0.4 mg during anaesthesia.

In the seven monitored patients, the infusion rates varied from 0.35 to 0.66 mg kg⁻¹ h⁻¹ (mean 0.48) and lasted from 31 to 285 min. Spontaneous respiration returned between 5 and 21 min after the infusion had been discontinued, 4 min after neostigmine 2.5 mg had been given on two occasions and at or before the neostigmine in the remainder.

In the 48 non-monitored patients, the infusion rate varied from 0.36 to 0.86 mg kg⁻¹ h⁻¹ (mean 0.50) and lasted from 25 to 240 min. Spontaneous respiration returned between 5 and 40 min after the infusion had been discontinued, before the neostigmine (which was omitted four times) in 18 patients, and in 4 min or less after the neostigmine in all except three patients. The doses of atracurium used in these infusions are greater than those used by Eager, Flynn and Hughes (1984), possibly because less fentanyl was used and none of the patients was given halothane. There were no problems with reversal, even in those patients where a change in surgical plan at operation resulted in a shorter procedure than expected. I have found that an atracurium infusion can be safely used without monitoring neuromuscular blockade.

D. E. ROWLANDS

REFERENCE


Sir,—We would agree with Dr Rowlands' finding that atracurium can be safely infused without the use of sophisticated monitoring equipment; indeed, such was the ultimate aim of our study.

However, in order to determine the rate of infusion needed to produce a suitable level of neuromuscular blockade, a quantitative assessment using such apparatus was made. The use of a syringe pump would obviously be safer with regard to control of the amount of drug infused, but we have also found paediatric infusion sets to be quite satisfactory. Such infusion sets are more generally available than syringe pumps.

If a peripheral nerve stimulator is not used there is a possibility of administering more atracurium than is absolutely necessary in order to ensure full surgical relaxation throughout the procedure. In our study we found that the level of block varied according to the degree of surgical stimulus. The difference in mean infusion rates between Dr Rowlands' and our study would appear to result from the different anaesthetic techniques used, as he suggested.

Finally, Dr Rowlands shows once again the usefulness of atracurium in geriatric and medically compromised patients. This continues to be one of the main indications for the use of this drug in our clinical practice.

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