(Acta Anaesth. Belg., Suppl., 2004, 55, 00-00)

Residual Curarisation : Outpatient versus Inpatient Surgery

G. CAMMU

The laryngeal mask airway (LMA) can be used successfully during procedures that have traditionally required endotracheal intubation, and has therefore become popular in ambulatory anaesthesia (1, 2). It is, however, debatable whether the LMA is safe for laparoscopy, or for ENT and oral surgery. And, because when a LMA is in place the only direction the stomach contents can go is into the lungs, its use is obviously contraindicated in non-starved patients and also in, for example, cholecystectomy. As a consequence of the widespread use of LMAs, it appears that neuromuscular blocking drugs (NMBDs) are not often used during day surgery (1, 2) in, for example, the UK, and succinylcholine especially is avoided because of possible muscle pain in young ambulatory patients. Mivacurium has been the NMBD of choice because of its pharmacological profile ; avoiding the need to administer anticholinesterases may reduce postoperative nausea and vomiting.

However, one should not rewrite evidence-based anaesthesiological principles : we know that the use of NMBDs provides muscle relaxation at a lighter, better-tolerated level of general anaesthesia. Every clinical anaesthetist will have encountered low blood pressures in patients when performing so-called deep inhalational anaesthesia ; and the 'sevoflurane 8% bolus technique' is poorly tolerated at the extremes of age (1). Moreover, the use of NMBDs together with endotracheal intubation has always been the standard for balanced anaesthesia with a secure airway, decreasing the risk of aspiration and causing fewer detrimental effects in the respiratory system. Finally, can we afford postoperative hoarseness and laryngeal injury (3) in day surgery when intubating patients without use of NMBDs ?

Whoever discusses the use of NMBDs must mention postoperative residual curarisation (PORC). PORC is an important predisposing factor for death in anaesthesia (4) and Berg and co-workers found it a significant risk factor for the development of postoperative pulmonary complications (5). Long-acting NMBDs are associated with an incidence of PORC > 40% (6) ; even the intermediate-acting NMBDs have an incidence of PORC of at least 20% (7). If there is one group of patients for whom PORC is a specific problem, it is those undergoing ambulatory surgery, as they will leave hospital some hours only after the induction of their anaesthesia. Therefore, we have investigated the administration profile of NMBDs in ambulatory anaesthesia as well as the incidence of PORC and its detection/treatment. We studied 320 inpatients and 320 outpatients receiving NMBDs, and found that only about 60% of outpatients had a train-of-four > 90% at arrival in the recovery ward. Even with mivacurium, about 10% of patients experienced PORC. On looking at the basis for decisions about pharmacological reversal and/or extubation, we found that the anaesthetists in our institution tended to use only clinical criteria or routine reversal. In only a minority of cases was neuromuscular transmission monitoring used. Clinical tests such as the patient's ability to open their eyes, breathe deeply, cough, lift their head and/or legs against gravity, swallow, and to resist the removal of a spatula from between their clenched teeth, were totally unreliable in our study. Even a combination of several clinical tests had a very low correlation with a quantitative train-of-four measurement.

How then can we avoid PORC in day-surgical patients ? Whether to use NMBDs is not at issue in my opinion. Avoiding long-acting NMBDs and preventing hypothermia are sensible measures, while allowing spontaneous recovery from an induced neuromuscular block will delay day-surgical programmes. The outcome of clinical tests is influenced by the effect of general anaesthesia, the degree of consciousness and postoperative pain. Objective monitoring of the neuromuscular blockade and reversing any train-of-four ratio < 90%, or routinely reversing any block with adequate doses

G. CAMMU, M.D., Ph.D., Anaesthetics and Critical Care Medicine, Onze-Lieve-Vrouw Clinic, Moorselbaan 164, B-9300 Aalst. E-mail : Guy.Cammu@olvz-aalst.be.

of the appropriate anticholinesterase, are the only two measures that remain viable in evidence-based practice (8). Neuromuscular transmission monitoring is, however, little used by the clinical anaesthesiologist (9) and anticholinesterase drugs may have disadvantages. Why do we not reduce the doses of NMBDs we use in clinical practice ? This would reduce the chance of PORC, since the duration of clinical effect for NMBDs depends on the dose given, and a somewhat longer onset time is of no clinical importance in day-surgical patients. We also anticipate the development of selective antagonists of the neuromuscular block, ideally free of muscarinic effects ; safe drugs that will act quickly and be able to reverse even profound blockade. Meanwhile, the only way we can reliably assess a neuromuscular block is by objective monitoring (8).

References

1. Fundamentals of Anaesthesia and Acute Medicine. Day Care Anaesthesia. Ian Smith. BMJ Books 2000.
2. Day surgery, including the preoperative assessment of the patient : a UK experience by a Belgian anaesthetist. G. Cammu and I. Smith, Acta Anaesth. Belg., **51**, 173-85, 2000.
3. Mencke T., Echternach M., Kleinschmidt S., Lux P., Barth V., Plinkert P. K., Fuchs-Buder T., *Laryngeal morbidity and quality of tracheal intubation : a randomized controlled trial*, Anesthesiology, **98**, 1049-56, 2003.
4. Lunn J. N., Hunter A. R., Scott D. B., *Anaesthesia-related surgical mortality*, Anaesthesia, **38**, 1090-6, 1983.
5. Berg H., Viby-Mogensen J., Roed J., *et al.*, *Residual neuromuscular block is a risk factor for postoperative pulmonary complications : a prospective, randomised, and blinded study of postoperative pulmonary complications after atracurium, vecuronium and pancuronium*, Acta Anaesthesiol Scand, **41**, 1095-103, 1997.
6. Beemer G. H., Rozental P., *Postoperative neuromuscular function*, Anaesth. Intensive Care, **14**, 41-5, 1986.
7. Debaene B., Plaud B., Dilly M. P., Donati F., *Residual paralysis in the PACU after a single intubating dose of nondepolarizing muscle relaxant with an intermediate duration of action*, Anesthesiology, **98**, 1042-8, 2003.
8. Eriksson L. I., *Evidence-based practice and neuromuscular monitoring. It's time for routine quantitative assessment*, Anesthesiology, **98**, 1037-9, 2003.
9. Osmer C., Vogele C., Zickmann B., Hempelmann G., *Comparative use of muscle relaxants and their reversal in three European countries : a survey in France, Germany and Great Britain*, Eur. J. Anaesthesiol., **13**, 389-99, 1996.