During the 38 years of my professional activity, several pharmacological and technical innovations may be considered to have crucially contributed to the development of modern anesthesia. This includes opioid receptors in the dorsal horn, the principle of patient-controlled analgesia (PCA), and the introduction of propofol in replacement of barbiturates for induction and even maintenance of narcosis through target-controlled infusion systems. However, the most exciting discovery may have been the one of sugammadex for the reversal of steroidal neuromuscular blocking agent (NMBA) effects. The present issue contains an extensive and excellent review on the reversal of neuromuscular blockade by Dubois et al. (1).

Sugammadex was introduced after a long but unsuccessful search for an alternative to succinylcholine for short procedures or rapid sequence induction (RSI). Because of too many side-effects with the latter substance, companies have tried to find a muscle relaxant with a similar profile, i.e. fast onset and short duration of action. As substances studied appeared to offer no real advantage, while still not deprived of side-effects, an alternative approach was initiated, which resulted in the development of sugammadex. This compound is able to rapidly antagonize rocuronium and vecuronium at any moment, or at any degree of muscle relaxation following their injection, with a very low risk of post-operative residual curarization (PORC). However, since the application of sugammadex to that indication, the enthusiasm has not been universal, in so far as the FDA did not approve its use in the US, and RIZIV/INAMI was reluctant to reimburse sugammadex in full replacement of neostigmine where a dose of 2 mg/kg is reimbursed. This reimbursement policy was not intended to be permanent. A revision was planned after 18 months, a delay provided to allow time for evidencing prospectively that sugammadex, despite its higher cost, would be economically interesting through decreased morbidity, shorter operating room and post-anesthesia care unit stay, lower rate of ICU transfers ... However, the prospective randomized double-blind trial needed to demonstrate this evidence was not feasible, due to the required sample size and related costs.

During these 18 months, it appeared that sugammadex was more frequently used than initially calculated. To anticipate the decision by RIZIV/INAMI, a Task Force was organized, assembling colleagues and experts throughout the country, and originating from university, community and private hospitals, to share their experiences. It became clear that, as anticipated, the 16 mg/kg dose was rarely required. It was suggested to restrict this dose to rapid sequence induction doses of rocuronium, and

Marcel Vercauteren, Antwerp University Hospital.

Correspondence address: Marcel Vercauteren, Department of Anesthesia, Antwerp University Hospital, Wilrijkstraat 10, 2650 Edegem, Belgium.
E-mail: marcel.vercauteren@uza.be
only in a cannot intubate, cannot ventilate (CICV) condition. When intubation is impossible, and ventilation appears to be difficult, reversal may be achieved with lower doses of sugammadex, taking account of the time already spent with the intubation trials and the given dose of rocuronium or vecuronium. Indeed, this dose is rarely a full RSI dose.

The 4 mg/kg dose for reversal of deep muscle relaxation, i.e. no motor response to Train of Four (TOF) stimulation but more than 1 response to Post Tetanic Count (PTC), may stimulate anesthesiologists to maintain optimal surgical conditions until the end of surgeries such as abdominal or head and neck surgery. Previously, maintaining such conditions close to the end of surgery were mostly and partially achieved through an increase in hypnotic (propofol or volatile anesthetic agents) or anti-nociceptive (opioids) agent concentration, rather than through the administration of NMBA supplements.

The Task Force had more concerns about the reimbursement conditions for the 2 mg/kg dose. It is unclear who has inspired RIZIV/INAMI to determine these conditions. I personally also have similar criticism about the reimbursement conditions of intravenous or epidural PCA analgesic techniques: why not financing a continuous epidural infusion technique? Reimbursement conditions are also very unclear regarding truncal block techniques: are continuous infusions concerned or PCA techniques only? More recently, another change has led to aberration, since spinal, epidural or brachial plexus anesthesia for minor limb surgery are reimbursed, but peripheral nerve blocks of the lower extremity have been entirely ignored. Returning to sugammadex, the required reimbursement condition of a contraindication to neostigmine is completely incomprehensible. Allergy to neostigmine has been reported only once in the literature, while bowel, urinary or biliary tract obstruction, if they exist, are generally the reason for the intended surgical procedure itself. The Task Force has insisted, unfortunately without success, to redefine the reimbursement conditions and the contraindications to neostigmine. It has proposed to restrict those contraindications to patients suffering from pulmonary problems, including bronchial asthma, to patients who cannot support heart rhythm or output fluctuations, to subjects at high risk of postoperative nausea and vomiting, to patients suffering from neuromuscular diseases such as Duchenne’s dystrophy, Steinert myotonia and myasthenia, to the morbidly obese patient, to geriatric patients, and to pediatric patients.

Unlike other countries, Belgian patients are spoiled in a certain way, as many treatments and drugs are completely or partially reimbursed. For costs not reimbursed by RIZIV/INAMI, patients have the option of being covered by additional hospitalization insurances. In case of surgery, the costs of anesthesia-related medications and equipment are only a few percent of the whole hospitalization bill. Should all anesthesia-related costs be reimbursed, while surgery consumes a large part of available funds? In addition, patients are generally prone to accept paying for the surgical part, whatever it may cost, while any kind of supplement related to anesthesia is often considered to be unacceptable. Although it may seem to result from a lack of respect for our specialty, we ourselves may be partly responsible for this attitude. Indeed, we should question our own perception of the good, the bad, and the ugly: in our daily practice, should the cost for one vial, which generally contains enough molecules for a 2 mg/kg bolus dose, really prevent us from choosing what we believe to be the best treatment? If we are convinced of the latter, then we should become more pro-active in defending what we, as anesthesiologists, and we alone, consider to be ready for a change in our daily routine practice.

Typically, Belgian individuals search for compromises to combine the best of both worlds. This has resulted in practices to maintain neostigmine, combined with a ‘low’ dose (< 2 mg/kg) of sugammadex. I agree with Dubois et al. (1) that it is highly questionable whether this ‘solution’ is really to be recommended. PORC may be at risk again when overconfidence leads to under-dosing. The eventual use of an informed consent procedure for sugammadex must absolutely be avoided. Why should we proceed this way, while most patients are not even informed that, for a total hip or knee prosthesis material, they will be charged an amount of around 1000€, without reimbursement by RIZIV/INAMI?

References