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CORRESPONDENCE

The use of sugammadex in obese patients

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To the Editor,

We read with great interest the paper by Le Corre *et al.* on recurarization after reversal of rocuronium-induced neuromuscular block (NMB) with sugammadex.[1] The authors reported a case of respiratory failure in an obese patient requiring sedation and tracheal intubation in the postoperative period. This situation occurred despite initial reversal of NMB to a train-of-four (TOF) ratio > 0.9 with sugammadex 1.74 $mg \cdot kg^{-1}$.[1] We congratulate the authors for successful management of this case, and we take this opportunity to underscore an important aspect of the perioperative management of NMB in obese patients.[1] Upper airway obstruction (UAO) in obese patients, which may be caused by the residual effects of the neuromuscular blocking agents (NMBAs),[2-4] may lead to upper airway collapse and respiratory impairment in the postoperative period.[1-3] To avoid these complications, a recovery to a TOF ratio ≥ 0.9 at the adductor pollicis muscle is generally recommended.[2,3] However, there is evidence that upper airway dysfunction and partial UAO may occur in some individuals even with recovery of the TOF ratio to ≥ 0.9.[2-4] The pharyngeal muscles are particularly susceptible to the residual effects of NMBAs.[3,4] The impairment of the integrity of the upper airway may put obese individuals at risk for upper airway collapse and increase the risk for postoperative respiratory complications.[1-4] In our view, the recovery of a TOF ratio of 0.9 should be considered insufficient, particularly in obese patients who have a pharyngeal lumen reduced in size due to peripharyngeal fatty tissue deposition and are at increased risk of UAO.[3,4] We recommend to wait until a TOF ratio of 1.0 has been attained before proceeding with tracheal extubation in obese patients and to consider this value the goal for an adequate recovery from NMB in this patient population.[2] In our experience, sugammadex now represents the best pharmacological approach to reach the threshold of 1.0 quickly and to reduce the risk of postoperative UAO and its associated morbidity.[1,2] To achieve this outcome, however, it is necessary to adjust the dose of sugammadex to the level of spontaneous recovery (i.e., 2 $mg \cdot kg^{-1}$ at reappearance of T_1-T_2)[3,4] and base sugammadex dosing on total body weight, despite some recent evidence of efficacy of doses calculated on ideal body weight.[5] Using the correct use of sugammadex changes the intraoperative management of NMB, but it also reduces the risk of residual paralysis or recurarization in obese patients.

Competing interests None declared.

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Reply

We thank Dr. Carron *et al.* for their interest in our case report on recurarization after reversal of rocuronium-induced neuromuscular block with sugammadex in an obese patient.[1] They pointed out that, until now, data on residual curarization and associated risks have been collected in a non-obese population. Thus, management of neuromuscular monitoring is well-described for a non-obese population. Also, Carron *et al.* claim that the pharmacology of sugammadex in the obese population has been neglected in the clinical development of the drug. In spite of sparse data, experts maintain that sugammadex is particularly indicated in this special population, especially during bariatric procedures. In view of that, we need to document more precisely the specificities of neuromuscular monitoring, risk of residual curarization, and pharmacology of sugammadex in the obese patient.

The dose of rocuronium should be based on ideal body weight (IBW) rather than total body weight (TBW).[2] In the case reported, we aimed to emphasize the limitations of neuromuscular monitoring and the limited data concerning how to calculate the effective dosage in an obese patient. All drugs in anesthesia, and probably in all of medicine, are developed in selected groups of patients without comorbidities or with only one comorbidity (e.g., renal or hepatic disease), and this strategy often excludes the obese patient. Data for this particular population are usually obtained after drugs are launched on the market. Considering that the number of overweight patients is increasing, it appears important in future to recommend that the pharmaceutical industry document these specificities before drug approval.

Two controlled studies have been published recently on sugammadex in the obese patient. In one study, Van Lancker *et al*. adjusted the dose of sugammadex using four different weight corrections: IBW, IBW+20%, IBW+40%, and TBW.[3] Time to complete recovery was similar in the IBW+40% and TBW groups but slightly longer in the other groups. In morbidly obese patients, the authors concluded that sugammadex 2 $mg \cdot kg^{-1}$ based on IBW+40% can safely reverse at the time of reappearance of the second twitch after train-of-four (TOF) stimulation. The second study compared neostigmine 0.05 $mg \cdot kg^{-1}$ with sugammadex 2 $mg \cdot kg^{-1}$ given when two twitches reappear.[4] For both drugs, the dosage was based on the corrected body weight (IBW+0.4[TBW-IBW]). Time to TOF $>$ 0.9 for sugammadex and neostigmine was 2.73 (0.97) min and 9.63 (3.78) min, respectively. These two studies emphasize that sugammadex and neostigmine can be used safely in morbidly obese patients with dosages based on a weight less than TBW.

Competing interests Benoît Plaud has participated in the clinical development of sugammadex as a co-investigator in two Phase III studies funded by Merck™, and he has given paid lectures and attended conferences for the same company.

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