# Sugammadex Dosing in Bariatric Patients

*To the Editor:*

We read with interest the article by Llauradó *et al.*[1] focusing on the efficiency of ideal body weight–adjusted sugammadex dosing in patients undergoing bariatric surgery. The authors report a high incidence of slow responders and outliers leading to a potential risk of recurarization; they consider ideal body weight–adjusted dosing of sugammadex as unsafe. However, we feel that a significant lack of clarity in both design and methods makes it difficult to draw any conclusion from that study.

First, patients in the deep-block group had a posttetanic count (PTC) ≤ 2, thus including also those with no response to PTC. According to the good clinical research practice for pharmacodynamic studies of neuromuscular blocking agents, deep block is defined as no response to train-of-four stimulation but at least one response to the 15 PTC stimulations.[2] This definition is used because PTC1 is the deepest neuromuscular block that can be precisely defined; as soon as no response to PTC is detectable, neuromuscular block can no longer be quantified. Indeed, it may be close to return of the first PTC response, but it may also be much more intense, with no return to the first PTC answer for a long period. This heterogeneous group of neuromuscular blockade with no response to PTC is summarized as intense blockade.[2] Although the recommended dose of sugammadex to antagonize moderate or deep block is 2 and 4 mg/kg, respectively, only a few studies focused on sugammadex dosing for intense neuromuscular block, *i.e.*, when no response to PTC can be detected.[3,4] They proposed a dose between 8 and 16 mg/kg depending on the elapsed time interval between rocuronium injection and start of reversal. In the present study, however, these patients were also treated with 4 mg/kg ideal body weight sugammadex. Thus, independently of whether sugammadex dosing is based on real or ideal body weight, it was significantly underdosed in patients with no response to PTC. This may have contributed to the "outliers" observed by Llauradó *et al.* Second, all patients in the present study had either a PTC ≤ 2 or a train-of-four count ≥ 2. Not 1 of the 120 patients included in this observational study has a neuromuscular block level in between, that is, corresponding to 3–15 PTC or a train-of-four count of 1. This is at least surprising and let suppose an active control rather than a real observation. Third, induction of anesthesia was not standardized; some patients received succinylcholine, whereas others did not. This, however, does not facilitate the interpretation of the results. How can the authors exclude that some of the patients in their study were "slow responders" or "outliers" because of impaired plasmacholinesterase activity leading to slow succinylcholine metabolism rather than a delayed response to sugammadex-induced reversal? Fourth, there may be a bias in the patient's group assignment. According to the authors, the level of neuromuscular block at the end of surgery determined whether the patients were assigned to deep or moderate block group. However, the total dose of rocuronium was identical in both groups, and surgical time was slightly longer in the deep-block group. Thus, despite the same dose of rocuronium and somewhat longer surgical procedure, 43 patients had a profound block, whereas the remaining 77 patients had a shorter duration but only a moderate neuromuscular block. Interindividual variability to neuromuscular blocking agents is large and the group assignment let suppose that patients more "resistant" to rocuronium were assigned to the moderate group, whereas patients more "sensitive" to rocuronium were assigned to the deep group. Finally, if the train-of-four ratio did not reach 0.9 within 2 or 3 min, respectively, a second dose of sugammadex was given. This, however, did not allow to draw any conclusions on either the risk of recurarization or the time course of an ideal body weight–adjusted sugammadex dosing.

**Denis Schmartz, M.D.,* Philippe Guerci, M.D., Thomas Fuchs-Buder, M.D., Ph.D.** *CHU de Nancy, Hôpital Brabois Adultes, Institut Lorrain du Coeur et des Vaisseaux Louis Mathieu, France. d.schmartz@chu-nancy.fr

## References

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*In Reply:*

We read with interest the valuable comments of Schmartz *et al.*, which require some clarifications.

Succinylcholine was used in 14 patients (three in deep blockade [DB] and 11 in moderate blockade [MB]). After excluding patients administered succinylcholine, main data, expressed as median (range) and [percentile 10–90] were total dose of rocuronium (mg), 107.5 (70–290) [85.5–148.7] DB *versus* 100 (50–180) [68–157] MB, $P = 0.169$; total dose of sugammadex (mg), 250 (120–520) [200–454] DB *versus* 150 (100–320) [110–273] MB, $P < 0.001$; dose of sugammadex per real body weight (mg/kg), 2.30 (1.12–4.42) [1.51–3.925] DB *versus* 1.2272