Sugammadex for treatment of postoperative residual curarization in a morbidly obese patient

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To the Editor,

Small degrees of postoperative residual curarization increase the incidence of critical respiratory events (CREs) in the postanesthesia care unit (PACU).^{1,2} Certain patients, especially morbidly obese subjects, may be more susceptible to CREs, and prompt treatment is required when the situation occurs.^{1,2} This was the case in our patient who provided written consent for the publication of this report.

A 44-yr-old woman (height 177 cm, weight 160 kg, body mass index $51 \text{ kg}\cdot\text{m}^{-2}$) received a propofol and remifentanyl general anesthesia for a laparoscopic sleeve gastrectomy. Her neuromuscular function was monitored by acceleromyography (AMG) (TOF-Watch®, Organon Teknik, Ireland) at the adductor pollicis muscle. After anesthesia induction, we used calibration mode 1 on the TOF-Watch, which yielded a train-of-four (TOF) ratio of 1.06. Rocuronium 70 mg was given to facilitate tracheal intubation, followed by intermittent doses of 10 mg to maintain a TOF ratio < 0.5 (100 mg *iv* total). At the end of the uneventful 85-min surgical procedure, remifentanyl was discontinued and the propofol infusion was tapered. Neostigmine 4.5 mg and atropine 0.7 mg were administered when the TOF ratio was 0.14. Nine minutes later, the TOF ratio had increased to 0.91, and the propofol infusion was stopped. The tracheal tube was removed six minutes later as the patient was able to respond to verbal commands. The patient, on spontaneous breathing without signs of respiratory distress, was kept in a 30° head-up position and transferred within five minutes to the PACU with supplemental oxygen due to hypoxemia (oxygen saturation [SpO_2] $< 92\%$ on room air). After ten minutes in the

PACU (30 min after neostigmine), the patient complained of weakness. Her SpO_2 had decreased to 89%, requiring an increase in oxygen flow rate from 4 to $8 \text{ L}\cdot\text{min}^{-1}$ to maintain $\text{SpO}_2 > 92\%$. Low stimulation current (30 mA) was applied to check the patient's neuromuscular recovery, but no information could be obtained because of patient movement. Postoperative residual curarization was suspected, and sugammadex 50 mg was given. Within five minutes, the patient recovered completely and was able to breathe room air without oxygen ($\text{SpO}_2 > 92\%$). The patient was discharged to the surgical ward after a two-hour stay in the PACU without further complications.

Postoperative CREs can occur despite recovery of a TOF ratio ≥ 0.9 measured by AMG.^{1–3} Mechanomyography (MMG) is the gold standard for monitoring neuromuscular function.³ Baseline TOF ratio measured using MMG is usually 1.0 or very close to 1.0.³ Baseline TOF ratio measured by AMG is usually greater than 1.0 and varies widely among patients.³ Therefore a TOF ratio of 0.9 displayed during recovery does not always indicate adequate neuromuscular recovery unless the value is normalized with respect to baseline.³ If a CRE occurs after neostigmine, prompt treatment is required and sugammadex should be considered the drug of choice.^{1,2} Neostigmine may also reverse rocuronium-induced residual neuromuscular blockade (NMB),⁴ but it is associated with side effects and has a relatively slow onset of action, particularly in morbidly obese patients.^{4,5} Furthermore, there is a ceiling on its efficacy so that doses exceeding 5 mg are unlikely to achieve any additional effect.⁴ Finally, neostigmine may impair genioglossus function and decrease upper airway volume when administered after recovery from NMB.⁵ Thus, it increases the risk of upper airway obstruction and postoperative CREs, especially in morbidly obese patients.^{1,2,5} Sugammadex $2 \text{ mg}\cdot\text{kg}^{-1}$

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might have been safer and faster than neostigmine in our patient.^{1,4} Sugammadex should be preferred to neostigmine as a rescue drug for the successful treatment of postoperative CREs related to rocuronium-induced residual NMB after neostigmine administration in morbidly obese patients.

Competing interests None declared.

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