

## Reversal of neuromuscular blockade with sugammadex in an obese myasthenic patient undergoing thymectomy

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To the Editor:

Myasthenia gravis (MG) is an autoimmune disease often characterized by circulating antibodies that block acetylcholine receptors at the postsynaptic neuromuscular junction. The resulting modified neuromuscular transmission leads to an unpredictable response in the administration of neuromuscular blocking agents in case of surgery.

We challenged the use of sugammadex, a modified  $\gamma$ -cyclodextrin, to reverse a deep rocuronium-induced blockade in a 31-year-old obese [95 kg; 1.60 m; body mass index (BMI) 37 kg/m<sup>2</sup>] female myasthenic patient. The patient was literally disabled, mainly from severe weakness affecting limb muscles, resulting in repetitive falls [Myasthenia Gravis Foundation of America (MGFA) class IVa]. She was referred for transsternal thymectomy due to a grossly hyperplastic thymus gland. Her daily dose of pyridostigmine was 240 (60  $\times$  4) mg. Preoperative blood gases in room air were satisfactory: partial pressure of arterial oxygen (PaO<sub>2</sub>) 93 mmHg and carbon dioxide (PaCO<sub>2</sub>) 36 mmHg, pH 7.43, saturation of peripheral oxygen (SpO<sub>2</sub>) 96%. Sugammadex encapsulates the steroidal neuromuscular-blocking agents (NMBAs) rocuronium and vecuronium, resulting in prompt reduction of free NMBA plasma concentration and rapid restoration of muscular activity. It lacks endogenous targets and is unlikely to cause any major adverse effects [1].

The patient was not premedicated; she received her usual dose of pyridostigmine. After induction (140 mg propofol, 0.25 mg fentanyl intravenously), neuromuscular monitoring was applied [baseline train-of-four (TOF) ratio T4/T1 0.92–1.02]. NMBAs have variable sensitivity in MG. Thus, dosage has to be carefully titrated and neuromuscular function continuously monitored [2, 3]. For this reason, repetitive TOF stimulation (TOF-Watch SX) was applied intraoperatively. Anesthesia was initially maintained with propofol 5 mg/kg per hour and then titrated according to bispectral index (BIS) values (target 40–50). A single bolus of rocuronium 0.5 mg/kg was administered to facilitate tracheal intubation. No maintenance doses of rocuronium were given. The neuromuscular blockade was considered adequate throughout surgery.

At the end of the 70-min surgical procedure (extended thymectomy), the TOF ratio was 0.3. The neuromuscular blockade was considered as deep compared with preoperative values, and a dose of 2 mg/kg sugammadex was administered intravenously. Within 3 min, the TOF ratio was 0.92; 7 min later, it was 1.02. The patient returned to spontaneous breathing (pressure support 15 cm/H<sub>2</sub>O, tidal volume 700 ml, respiratory rate 14 breaths/min) with satisfactory blood gases (PaO<sub>2</sub> 297 mmHg, PaCO<sub>2</sub> 41 mmHg, pH 7.42, SpO<sub>2</sub> 98%). Clinically, the patient was able to lift her head, open her eyes, and protrude her tongue. She was extubated in the operating room 10 min after the end of surgery. The patient had a 24 h-stay in the intensive care unit and had an uneventful recovery. She left the hospital in a good condition on the seventh postoperative day.

This case demonstrates that sugammadex effectively and safely reversed a deep rocuronium-induced neuromuscular blockade in an obese MG patient and allowed prompt weaning from mechanical ventilation postoperatively. Moreover, the surgical procedure (transsternal approach) has

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to be validated accordingly. As sugammadex's target is different from the neuromuscular junction, it seems to be very effective in reversing superficial and deep levels of neuromuscular blockade, especially in MG patients [3]. In our case, the combination of the MG severity, obesity, and type of surgical approach (median sternotomy) precluded postoperative mechanical ventilatory support.

To the best of our knowledge, this is the first reported case in the literature in which sugammadex was given in an obese MG patient undergoing this type of surgical procedure. Complete reversal of neuromuscular blockade before emergence from general anesthesia in MG patients is valid for avoiding postoperative morbidity. Thus, we suggest that sugammadex administration could be routinely

considered as part of the anesthesia management in MG patients.

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