



## Use of sugammadex in clinical practice

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Sugammadex, unlike acetylcholine esterase inhibitors (*e.g.*, neostigmine), reverses neuromuscular blockade rapidly and effectively by encapsulating free circulating steroidal neuromuscular blocking agents (*e.g.*, rocuronium) directly [1]. Moreover, sugammadex does not have muscarinic properties, whereas neostigmine has significant adverse muscarinic effects. Therefore, sugammadex is used in many countries as a new neuromuscular reversal agent to antagonize the neuromuscular blockade induced by steroidal neuromuscular blocking agents.

A few studies have investigated the effects of sugammadex on postoperative pulmonary outcome. A recent study conducted by Cho *et al.* [2] showed that use of sugammadex for neuromuscular reversal was associated with reduced postoperative pulmonary complications in adult patients undergoing video-assisted thoracoscopic lobectomy to remove lung cancer. Their study indicated that sugammadex may improve clinical outcomes in surgical patients by decreasing postoperative pulmonary complications due to incomplete neuromuscular recovery, although their study was retrospective and the sample size was small. Similarly, a large-scale retrospective study comparing the effects of neuromuscular reversal agents on postoperative complications in older patients with American Society of Anesthesiologists physical status 3–4 demonstrated that the risk of postoperative pulmonary complications was significantly lower in patients treated with sugammadex compared to those treated with neostigmine [3]. Another meta-analysis comparing respiratory signs of residual neuromuscular blockade after administration of sugammadex versus neostigmine showed that sugammadex

considerably reduces minor, but not serious, respiratory events during the postoperative period [4]. However, a prospective randomized trial with adequate power is needed to confirm the potentially beneficial effect of sugammadex on postoperative pulmonary outcomes.

Anesthesiologists should consider residual neuromuscular blockade after using a neuromuscular blocking agent intraoperatively, because residual neuromuscular blockade is closely associated with the development of postoperative pulmonary complications [5,6]. Additionally, intraoperative and postoperative use of neuromuscular monitoring devices is helpful for reducing the adverse postoperative pulmonary events caused by decreasing the incidence of residual neuromuscular blockade. Numerous clinical investigations have demonstrated that sugammadex is more effective than neostigmine for decreasing the incidence of residual neuromuscular blockade and enhancing neuromuscular recovery [7–11].

In summary, residual neuromuscular blockade is a significant risk factor for postoperative pulmonary complications. Sugammadex-based reversal seems to be superior to neostigmine-based reversal to minimize the risk of residual paralysis-induced pulmonary complications during the postoperative period, although the evidence remains insufficient. Further studies are required to verify the beneficial effect of sugammadex on clinical outcomes.

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## References

1. Fuchs-Buder T, Meistelman C, Raft J. Sugammadex: clinical development and practical use. *Korean J Anesthesiol* 2013; 65: 495-500.
2. Cho HC, Lee JH, Lee SC, Park SY, Rim JC, Choi SR. Use of sugammadex in lung cancer patients undergoing video-assisted thoracoscopic lobectomy. *Korean J Anesthesiol* 2017; 70: 420-5.
3. Ledowski T, Falke L, Johnston F, Gillies E, Greenaway M, De Mel A, et al. Retrospective investigation of postoperative outcome after reversal of residual neuromuscular blockade: sugammadex, neostigmine or no reversal. *Eur J Anaesthesiol* 2014; 31: 423-9.
4. Abad-Gurumeta A, Ripollés-Melchor J, Casans-Francés R, Espinosa A, Martínez-Hurtado E, Fernández-Pérez C, et al. A systematic review of sugammadex vs neostigmine for reversal of neuromuscular blockade. *Anaesthesia* 2015; 70: 1441-52.
5. Murphy GS, Szokol JW, Marymont JH, Greenberg SB, Avram MJ, Vender JS. Residual neuromuscular blockade and critical respiratory events in the postanesthesia care unit. *Anesth Analg* 2008; 107: 130-7.
6. Berg H, Roed J, Viby-Mogensen J, Mortensen CR, Engbaek J, Skovgaard LT, et al. Residual neuromuscular block is a risk factor for postoperative pulmonary complications. A prospective, randomised, and blinded study of postoperative pulmonary complications after atracurium, vecuronium and pancuronium. *Acta Anaesthesiol Scand* 1997; 41: 1095-103.
7. Blobner M, Eriksson LI, Scholz J, Motsch J, Della Rocca G, Prins ME. Reversal of rocuronium-induced neuromuscular blockade with sugammadex compared with neostigmine during sevoflurane anaesthesia: results of a randomised, controlled trial. *Eur J Anaesthesiol* 2010; 27: 874-81.
8. Esteves S. Can residual paralysis be avoided?: a critical appraisal of the use of sugammadex. *Eur J Anaesthesiol* 2015; 32: 663-5.
9. Kopman AF, Zank LM, Ng J, Neuman GG. Antagonism of cisatracurium and rocuronium block at a tactile train-of-four count of 2: should quantitative assessment of neuromuscular function be mandatory? *Anesth Analg* 2004; 98: 102-6.
10. Brueckmann B, Sasaki N, Grobara P, Li MK, Woo T, de Bie J, et al. Effects of sugammadex on incidence of postoperative residual neuromuscular blockade: a randomized, controlled study. *Br J Anaesth* 2015; 115: 743-51.
11. Cheong SH, Ki S, Lee J, Lee JH, Kim MH, Hur D, et al. The combination of sugammadex and neostigmine can reduce the dosage of sugammadex during recovery from the moderate neuromuscular blockade. *Korean J Anesthesiol* 2015; 68: 547-55.