

CADTH RAPID RESPONSE REPORT: REFERENCE LIST

# Sugammadex for the Recovery of Neuromuscular Blockade in Adult Patients: Clinical Effectiveness and Cost-Effectiveness – An Update

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**Authors:** Camille Dulong, Kelly Farrah

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## Research Questions

1. What is the clinical effectiveness regarding the use of sugammadex for the recovery of neuromuscular blockade in adult patients?
2. What is the cost-effectiveness regarding the use of sugammadex for the recovery of neuromuscular blockade in adult patients?

## Key Findings

Five systematic reviews (four with meta-analyses), 13 randomized controlled trials, and three non-randomized studies were identified regarding the clinical effectiveness of sugammadex in adult patients who are recovering from neuromuscular blockade.

## Methods

This report updates a literature search of a previous CADTH report. For the current report, a limited literature search was conducted by an information specialist on key resources including PubMed, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concept was sugammadex. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between April 26, 2016 and May 27, 2019. Internet links were provided, where available.

## Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

**Table 1: Selection Criteria**

<b>Population</b>	Adult patients recovering from neuromuscular blockade (i.e., reversing the effects of the neuromuscular blockade)
<b>Intervention</b>	Sugammadex (Tradename: Bridion)
<b>Comparator</b>	Neostigmine with/without atropine; Neostigmine with or without glycopyrrolate; no treatment (spontaneous recovery)

<b>Outcomes</b>	Q1: Clinical effectiveness (e.g., recovery time, time to extubation, post-operative residual paralysis); safety (e.g., renal function, bleeding); benefits/harms (e.g., pulmonary complications, re-intubation) Q2: Cost-effectiveness
<b>Study Designs</b>	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, and economic evaluations

## Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and economic evaluations.

Five systematic reviews (four with meta-analyses), 13 randomized controlled trials, and three non-randomized studies were identified regarding the clinical effectiveness of sugammadex in adult patients who are recovering from neuromuscular blockade. No relevant health technology assessments or economic evaluations were identified.

Additional references of potential interest are provided in the appendix.

### Health Technology Assessments

No literature identified.

### Systematic Reviews and Meta-analyses

1. Hafeez KR, Tuteja A, Singh M, et al. Postoperative complications with neuromuscular blocking drugs and/or reversal agents in obstructive sleep apnea patients: a systematic review. *BMC Anesthesiol.* 2018 Jul 19;18(1):91.  
[PubMed: PM30025517](#)
2. Hristovska AM, Duch P, Allingstrup M, Afshari A. The comparative efficacy and safety of sugammadex and neostigmine in reversing neuromuscular blockade in adults. a Cochrane systematic review with meta-analysis and trial sequential analysis. *Anaesthesia.* 2018 May;73(5):631-641.  
[PubMed: PM29280475](#)
3. Carron M, Zarantonello F, Lazzarotto N, Tellaroli P, Ori C. Role of sugammadex in accelerating postoperative discharge: a meta-analysis. *J Clin Anesth.* 2017 Jun;39:38-44.  
[PubMed: PM28494905](#)
4. Hristovska AM, Duch P, Allingstrup M, Afshari A. Efficacy and safety of sugammadex versus neostigmine in reversing neuromuscular blockade in adults. *Cochrane Database Syst Rev.* 2017 Aug 14;8:CD012763.  
[PubMed: PM28806470](#)
5. Carron M, Zarantonello F, Tellaroli P, Ori C. Efficacy and safety of sugammadex compared to neostigmine for reversal of neuromuscular blockade: a meta-analysis of randomized controlled trials. *J Clin Anesth.* 2016 Dec;35:1-12.  
[PubMed: PM27871504](#)

## Randomized Controlled Trials

6. Kim NY, Koh JC, Lee KY, et al. Influence of reversal of neuromuscular blockade with Sugammadex or neostigmine on postoperative quality of recovery following a single bolus dose of rocuronium: a prospective, randomized, double-blinded, controlled study. *J Clin Anesth.* 2019 Mar 30;57:97-102.  
[PubMed: PM30939422](#)
7. Abdulatif M, Lotfy M, Mousa M, Afifi MH, Yassen K. Sugammadex antagonism of rocuronium-induced neuromuscular blockade in patients with liver cirrhosis undergoing liver resection: a randomized controlled study. *Minerva Anesthesiol.* 2018 Aug;84(8):929-937.  
[PubMed: PM29405667](#)
8. Paech MJ, Kaye R, Baber C, Nathan EA. Recovery characteristics of patients receiving either sugammadex or neostigmine and glycopyrrolate for reversal of neuromuscular block: a randomised controlled trial. *Anaesthesia.* 2018 Mar;73(3):340-347.  
[PubMed: PM29214645](#)
9. Alsaeed A, Bamehriz F, Eldin S, Alzahrani T, Alharbi A, Eldawlatly A. Sugammadex versus two doses of neostigmine for reversal of rocuronium in gastric sleeve surgery. *Saudi J Anaesth.* 2017 Jul-Sep;11(3):309-311.  
[PubMed: PM28757832](#)
10. Batistaki C, Riga M, Zafeiropoulou F, Lyrakos G, Kostopanagiotou G, Matsota P. Effect of Sugammadex versus neostigmine/atropine combination on postoperative cognitive dysfunction after elective surgery. *Anaesth Intensive Care.* 2017 Sep;45(5):581-588.  
[PubMed: PM28911287](#)
11. Choi ES, Oh AY, Koo BW, et al. Comparison of reversal with neostigmine of low-dose rocuronium vs. reversal with sugammadex of high-dose rocuronium for a short procedure. *Anaesthesia.* 2017 Oct;72(10):1185-1190.  
[PubMed: PM28493510](#)
12. Evron S, Abelansky Y, Ezri T, Izakson A. Respiratory events with sugammadex vs. neostigmine following laparoscopic sleeve gastrectomy: a prospective pilot study assessing neuromuscular reversal strategies. *Rom J Anaesth Intensive Care.* 2017 Oct;24(2):111-114.  
[PubMed: PM29090263](#)
13. Loh PS, Miskan MM, Chin YZ, Zaki RA. Staggering the dose of sugammadex lowers risks for severe emergence cough: a randomized control trial. *BMC Anesthesiol.* 2017 Oct 11;17(1):137.  
[PubMed: PM29020936](#)
14. Nemes R, Fulesdi B, Pongracz A, et al. Impact of reversal strategies on the incidence of postoperative residual paralysis after rocuronium relaxation without neuromuscular monitoring: a partially randomised placebo controlled trial. *Eur J Anaesthesiol.* 2017 Sep;34(9):609-616.  
[PubMed: PM28030444](#)

15. Tas Tuna A, Palabiyik O, Orhan M, Sonbahar T, Sayhan H, Tomak Y. Does sugammadex administration affect postoperative nausea and vomiting after laparoscopic cholecystectomy: a prospective, double-blind, randomized study. *Surg Laparosc Endosc Percutan Tech*. 2017 Aug;27(4):237-240.  
[PubMed: PM28731951](#)
16. Piskin O, Kucukosman G, Altun DU, et al. The effect of sugammadex on postoperative cognitive function and recovery. *Braz J Anesthesiol*. 2016 Jul-Aug;66(4):376-382.  
[PubMed: PM27343787](#)
17. Sen A, Erdivanli B, Tomak Y, Pergel A. Reversal of neuromuscular blockade with sugammadex or neostigmine/atropine: effect on postoperative gastrointestinal motility. *J Clin Anesth*. 2016 Aug;32:208-213.  
[PubMed: PM27290978](#)
18. Unal DY, Baran I, Mutlu M, Ural G, Akkaya T, Ozlu O. Comparison of sugammadex versus neostigmine costs and respiratory complications in patients with obstructive sleep apnoea. *Turk J Anaesthesiol Reanim*. 2015 Dec;43(6):387-395.  
[PubMed: PM27366535](#)

## Non-Randomized Studies

19. Kirmeier E, Eriksson LI, Lewald H, et al. Post-anaesthesia pulmonary complications after use of muscle relaxants (POPULAR): a multicentre, prospective observational study. *Lancet Respir Med*. 2019 Feb;7(2):129-140.  
[PubMed: PM30224322](#)
20. Oh TK, Oh AY, Ryu JH, et al. Retrospective analysis of 30-day unplanned readmission after major abdominal surgery with reversal by sugammadex or neostigmine. *Br J Anaesth*. 2019 Mar;122(3):370-378.  
[PubMed: PM30770055](#)
21. Min KC, Woo T, Assaid C, et al. Incidence of hypersensitivity and anaphylaxis with sugammadex. *J Clin Anesth*. 2018 Jun;47:67-73.  
[PubMed: PM29621739](#)

## Economic Evaluations

No identified literature.

## Appendix — Further Information

### Previous CADTH Reports

22. Sugammadex for the reversal of neuromuscular blockade in adult patients: a review of clinical effectiveness and cost-effectiveness. (*CADTH Rapid response: summary with critical appraisal*). Ottawa (ON): CADTH; 2016:  
<https://www.cadth.ca/sugammadex-reversal-neuromuscular-blockade-adult-patients-review-clinical-effectiveness-and-cost>. Accessed 2019 May 31.
23. Sugammadex for adults undergoing surgery: clinical and cost-effectiveness and guidelines. (*CADTH Rapid response: reference list*). Ottawa (ON): CADTH; 2016:  
<https://www.cadth.ca/sugammadex-adults-undergoing-surgery-clinical-and-cost-effectiveness-and-guidelines-0>. Accessed 2019 May 31.

### Randomized Controlled Trials

#### *Neuromuscular Blockade Not Specified in Patient Population*

24. Min KC, Bondiskey P, Schulz V, et al. Hypersensitivity incidence after sugammadex administration in healthy subjects: a randomised controlled trial. *Br J Anaesth*. 2018 Oct;121(4):749-757.  
[PubMed: PM30236237](#)

#### *Children Included in Patient Population*

25. Biricik E, Alic V, Karacaer F, Celiktas M, Unlugenc H. A comparison of intravenous Sugammadex and neostigmine + atropine reversal on time to consciousness during wake-up tests in spinal surgery. *Niger J Clin Pract*. 2019 May;22(5):609-615.  
[PubMed: PM31089014](#)

### Non-Randomized Studies

#### *Neuromuscular Blockade Not Specified in Patient Population*

26. Chae YJ, Joe HB, Oh J, Lee E, Yi IK. Thirty-day postoperative outcomes following sugammadex use in colorectal surgery patients; retrospective study. *J Clin Med*. 2019 Jan 16;8(1).  
[PubMed: PM30654513](#)

### Review Articles

27. de Boer HD, Carlos RV, Brull SJ. Is lower-dose sugammadex a cost-saving strategy for reversal of deep neuromuscular block? Facts and fiction. *BMC Anesthesiol*. 2018 Nov 6;18(1):159.  
[PubMed: PM30400850](#)
28. Fuchs-Buder T, Nemes R, Schmartz D. Residual neuromuscular blockade: management and impact on postoperative pulmonary outcome. *Curr Opin Anaesthesiol*. 2016 Dec;29(6):662-667.  
[PubMed: PM27755128](#)

29. Keating GM. Sugammadex: a review of neuromuscular blockade reversal. *Drugs*. 2016 Jul;76(10):1041-1052.  
[PubMed: PM27324403](#)

## Additional References

30. Brull SJ, Kopman AF. Current status of neuromuscular reversal and monitoring: challenges and opportunities. *Anesthesiology*. 2017 Jan;126(1):173-190.  
[PubMed: PM27820709](#)