



# Sugammadex: Do The Benefits Outweigh The Cost?

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## Background

- **Train of four (TOF)** is a neuromuscular monitoring technique used during recovery from the administration of general anesthesia to determine how well a patient's muscles are able to function.
- **Sugammadex** is a drug indicated for the reversal of moderate or deep neuromuscular blockade (NMB) by rocuronium, a muscle paralytic.
- Sugammadex could potentially benefit patients at SMJH who have contraindications or adverse affects related to anesthesia, neostigmine, or succinylcholine. It is not available at this time.

## Purpose

- The purpose of this literature review was to determine if TOF was achieved faster after neuromuscular blockade induced by nondepolarizing neuromuscular blocker with postoperative administration of sugammadex or neostigmine.
- A secondary purpose was to compare cost effectiveness of both drugs.

## Methods

- Keywords searched were neostigmine and sugammadex
- 294 articles found from CINAHL and MEDLINE
- We limited the search criteria to full text articles.
- Articles were limited to those written between 2010- 2016.
- Two additional articles were found on Google Scholar by using the same keywords
- Remaining articles were evaluated through a title and abstract search, to determine their fit with the research purpose.

## Results

- We included 9 articles that met all research criteria.
- Sugammadex as a reversal for NMB achieved TOF **faster** when compared with neostigmine regardless of the depth of block.
  - Patients who were reversed with neostigmine had greater instances of residual NMB and postoperative residual paralysis
- Few articles addressed a cost effectiveness comparison.
- Price may be often by a shorter hospital stay and a decreased probability of can't intubate, can't ventilate (CICV) events, long procedures or where the value of any decrease in recovery time is greater

	Type of Study	Medication	Comparison drug?	TOF met faster with sugammadex?	Cost-effective?	Weakness?
1	Nonrandomized pilot study	sugammadex	neostigmine	Yes 9 minutes for neostigmine vs. 3 minutes for sugammadex		Study did not perform baseline testing preoperatively.  This was a pilot study that was not randomized in order to form the preliminary basis of a randomized future study.
2	Prospective observational study	sugammadex 2 mg/kg	neostigmine and placebo	yes	not addressed	The TOF-Watch monitor was not calibrated before NMBD administration.
3	Literature review	sugammadex 16 mg	placebo	yes	not definitive	This was not an actual study. It was a literature review.
4	Multisite, prospective, nonrandomized, observational, real-life study	sugammadex	neostigmine	Shallow block- sugammadex reversed in 2.2 minutes and neostigmine in 6.9 minutes. Deep block- 2.4 minutes vs. 20.6 minutes		Many patients received the incorrect reversal dosages that were defined for shallow vs. deep neuromuscular block.
5	Randomized, active-controlled, parallel group, multicentre, safety assessor-blinded trial	sugammadex 4 mg	neostigmine 50 mcg	yes 3.4 times faster	not addressed	Only laparoscopic surgeries were performed for this study.
6	Observational audit	sugammadex	neostigmine	yes	yes- shorter hospital stay could fully offset cost increases	Multiple factors may have influenced the results of this study.
7	Retrospective study	sugammadex 2 mg/kg	neostigmine 0.05 mg/kg	yes	not addressed	Studied post operative delirium with the two medications but did establish that TOF was met faster with sugammadex than neostigmine.
8	Randomized safety assessor-blinded trial	sugammadex 2 mg/kg	neostigmine 50 mcg/kg	yes 8.1 times faster	not addressed	This study was only conducted in Korean patients.
9	Observational retrospective case note audit	sugammadex	neostigmine	yes 91.7 minutes for neostigmine vs. 62 minutes for sugammadex	this study looked at unrestricted vs. restricted used of sugammadex	Anesthesiologist sign off time decreased but O2 desaturations did not change with unrestricted use of sugammadex.

## Discussion

- Additional research would be appropriate to further evaluate the use of this drug.
- At SMJH, suggamandex has a higher cost
  - Costs are estimated to be approximately 42% higher for siggamandex
- Despite the cost, use of sugammadex may provide many benefits
  - Decreased overall hospital stay
  - Increasde patient satisfaction with anesthesia
  - Decreasde time anesthesiologist needs to be present
  - Improved patient outcomes
- In addition to these benefits, suggamandex can provide an alternative in emergent situations postoperatively

## Recommendations

- Propose use of this drug at SMJH and gain approval by appropriate SMJH committees.
- Schedule sessions for nurses and anesthesiologists to be educated on the use of sugammadex.
- Unrestricted access should be in place for use in OR and PACU due to emergent needs that may occur.
- Create and use a form for each time this drug is administered that would assess what type of situation it was being used for and why.
- Reevaluate in a year to see how often sugammadex is being used and for what situations.

References available upon request.