Sugammadex vs. Neostigmine in Overall Operating Room Time

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Summary

- PICO Question: Do patients that receive neuromuscular blockade (P) who are reversed with sugammadex (I) compared to those reversed with neostigmine (C) experience less overall operating room time.
- Efficient reversal of neuromuscular blockade (NMB) is critical for patient safety and for reducing delays in extubation and operating room (OR) turnover.
- Neostigmine, combined with the anticholinergic agent glycopyrrolate, relies on partial spontaneous recovery of NMB and often results in slower, less predictable reversal.
- Sugammadex encapsulates aminosteroid NMB agents (e.g., rocuronium, vecuronium), providing rapid and reliable reversal even from deep blockade and shortens OR time.
- Prolonged OR time contributes to increased healthcare costs, decreased workflow efficiency, and greater anesthesia exposure; faster reversal may mitigate these issues.
- While sugammadex is the more expensive drug at face value, it has the potential to decrease OR turnover time and provide hundreds of dollars in cost savings.

Purpose

- The purpose of this project is to offer education leading to quality improvement through the use of sugammadex as a standard reversal agent for non-depolarizing neuromuscular blockade as opposed to a neostigmine/glycopyrrolate combination.
- To inform evidence-based anesthesia practice that balances patient safety, clinical outcomes, and resource utilization.
- To support policy development in perioperative protocols regarding optimal NMB reversal strategies.

Methods

A systematic review was conducted using PubMed and the Cochrane Library to identify randomized controlled trials and comparative studies evaluating sugammadex versus neostigmine for reversal of neuromuscular blockade in adult surgical patients. Of all articles screened, only four studies met the inclusion criteria and were analyzed for this review. Studies reporting total operating room (OR) time or related perioperative efficiency outcomes were included, and data on patient characteristics, reversal timing, OR metrics, and adverse events were extracted by two independent reviewers.

Evidence

Study	Study Type	Sample Size	Outcome(s)	Conclusion / Key Findings
Sugammadex compared with Neostigmine/Glycopyrrolate: An Analysis of Total PACU Time, Responsiveness, and Potential for Economic Impact Lee et al., 2019	Prospective Quality Improvement Study	152 (76 per group)	Reduced OR time, Reduced PACU time, increased responsiveness, improved cost savings	Sugammadex reduced OR and PACU time by 6 minutes each and had higher full awakening rate (86% vs 79%). Potential cost savings estimated at $502 per patient.
Sugammadex versus Neostigmine for Routine Reversal of Rocuronium Block in Adult Patients: A cost analysis Hurford et al., 2020	Meta-analysis	32 studies, n varies (e.g., TOFR outcome n=21 studies)	Shorter reversal time, anesthesia time, PACU duration, Reduced bradycardia and reduced PONV	Sugammadex significantly reduced reversal time and PACU duration, and was associated with lower incidence of bradycardia and PONV.
Reduction of Nonoperative Time Using the Induction Room, Parallel Processing, and Sugammadex Kaddoum et al., 2022	Randomized Clinical Trial (RCT)	111	Decreased nonoperative time (NOT), Improved surgeon and patient satisfaction	Parallel processing with sugammadex significantly reduced NOT (25 vs 48 min). Surgeon satisfaction increased; patient satisfaction unchanged. *NOT=Non-Operative Time
Sugammadex versus Neostigmine for Routine Reversal of Neuromuscular Blockade and the Effect on Perioperative Efficiency Moss et al., 2022	Retrospective Cohort Study with Propensity Matching	8120 (4060 per group)	Decreased total OR time, surgical time, and PACU length of stay	Sugammadex associated with shorter OR and PACU times. Indicated improved efficiency possibly offsetting higher drug cost.

Discussion

How much do these medications cost at our facility?

Vs.

$115 per 200mg vial

$7 per max dose combo

- One minute of OR time costs $37 on average in the United States.
- While at face value the price difference between these reversals may seem large, sugammadex has been shown to have the potential to speed discharge from the OR by up to 22 minutes. Leading to potential cost savings of up to $814.
- Along with increased speed of OR turnover, sugammadex has been shown to reduce PACU times and decrease the incidence of post-operative complications, including, but not limited to post-operative airway obstruction and nausea/vomiting.

References

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