

Sugammadex vs. Neostigmine for Neuromuscular Blockade Reversal in Pediatric Patients: A Systematic Review and Age-Stratified Meta-Analysis

Hrithika Ravuri, BS¹, Shivani Srivastava, BS¹, Athena Nomula, BA¹, Mayank Paliwal, BA¹, Angelica Pavesio, BA¹, Shabaaz Baig, MD²

¹ Rutgers New Jersey Medical School, Newark, NJ ² Department of Anesthesiology, Brigham and Women's Hospital, Boston, MA

INTRODUCTION

Residual neuromuscular blockade occurs in up to 30% of pediatric patients receiving neostigmine and is associated with critical respiratory events.

Sugammadex offers more thorough reversal through direct rocuronium/vecuronium encapsulation.

Comparative evidence in infants and children remains limited.

STUDY QUESTION

Does Sugammadex provide faster more reliable neuromuscular recovery than neostigmine across pediatric age groups?

METHODS

- ❖ PRISMA guidelines were followed
- ❖ RCTs and observational studies; patients aged 0-17 years
- ❖ Two independent reviewers screened & extracted data
- ❖ Age stratification: infants <2 years vs. children 2–12 years

PRIMARY OUTCOMES

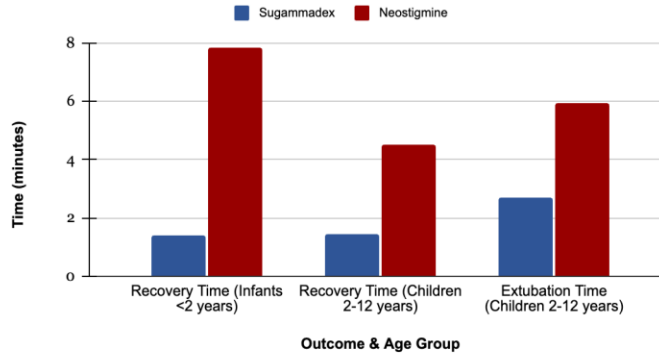
- Time to TOF ≥ 0.9
- Time to extubation

SECONDARY OUTCOMES

- Residual neuromuscular blockade (NMB)
- PONV
- Pulmonary complications

RESULTS

Sugammadex vs. Neostigmine: Recovery and Extubation Times Across Pediatric Age Groups



PRISMA

Records identified via PubMed, Embase, and CENTRAL
n = 270

Post Duplicate Removal + Abstract Screening
n = 197

Full Text Articles Assessed for Eligibility
n = 63

Studies Included in Review
n = 25

DISCUSSION

Sugammadex provides faster, more reliable recovery across all pediatric age groups.

The 6.5-minute faster recovery in infants <2 years is clinically meaningful given their heightened vulnerability to respiratory complications.

The 58% reduction in residual NMB (NNT=11) addresses a critical patient safety issue — residual paralysis is associated with airway obstruction, aspiration, and critical respiratory events.

Reductions in bradycardia and PONV represent added clinically important benefits.

CONCLUSIONS

- ❖ Sugammadex provides faster and more reliable neuromuscular recovery than neostigmine across all pediatric age groups
- ❖ 6.5-minute recovery benefit in infants <2 years is clinically meaningful
- ❖ Significant reductions in residual NMB, bradycardia, and PONV without deaths or anaphylaxis
- ❖ Supports sugammadex as the preferred reversal agent, particularly in high-risk pediatric populations