



REVERSAL OF ROCURONIUM-INDUCED NEUROMUSCULAR BLOCKADE USING SUGAMMADEX FOR PEDIATRIC PATIENTS AGES 0-24 MONTHS OLD UNDERGOING GENERAL ANESTHESIA: A SYSTEMATIC REVIEW



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INTRODUCTION

Neuromuscular blockade (NMB) when inadequately reversed may lead to postoperative complications. Residual blockade can cause hypoxia, leading to death. Sugammadex is the reversal agent for aminosteroid non-depolarizing NMB, such as Rocuronium. However, it has not been approved for use in children for less than 2 years old. There is limited data on its utilization in this age group.

OBJECTIVES

To determine the efficacy and safety of the reversal of NMB using Sugammadex for pediatric patients aged 0 to 24 months undergoing general anesthesia for surgery.

METHODS

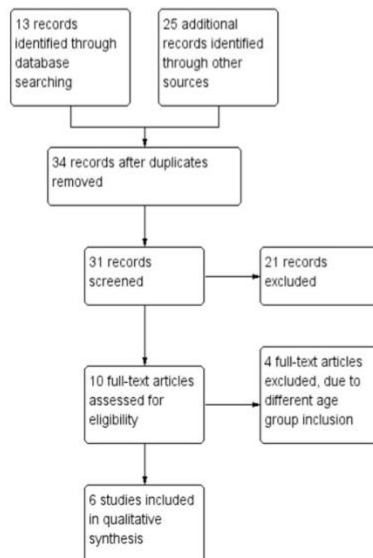


Figure 1. PRISMA flow diagram of literature search.

RESULTS

| Title (Date) Authors | Study type | Age | Surgical procedure | n | Sugammadex dose | Time to reappearance of T2 (min) | Time to post-tetanic count reappearance (min) | Time to TOF 0.9 (sec) | Time to extubation (min) | Adverse events |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------|------------------------------------------------------|----------------|-------------------------------------------|----------------------------------|-----------------------------------------------|---------------------------------------------|--------------------------|-------------------------------------------------------------------------------------------|
| Reversal of rocuronium-induced neuromuscular block by sugammadex in neonates (2014) by Alonso A, de Boer HD, Booi L | RCT | Group 1: 1 day old Group 2: 1-7 days old | Not stated | 8 15 | 4 mg/kg | - | - | 84 ± 54 72 ± 30 | - | None |
| Sugammadex in neonatal patient (2013) by Cardenas VH, Gonzalez FDM | Case report | Case 1: 20 days Case 2: premature (34 weeks) 9 weeks old | Pyloroplasty Anti-reflux surgery and pyloroplasty | 1 1 | 12 mg 6 mg | - | - | - | 2 2 | None None |
| Rocuronium and sugammadex in a 3 days old neonate for draining an ovarian cyst. Neuromuscular management and review of literature (2016) by Carlos RV, Torres MLA, de Boer H | Case report | 3 day old | Open drainage of ovarian cyst | 1 | 12 mg (4mg/kg) | - | - | 90 | 8 | None |
| Reversibility of rocuronium-induced deep neuromuscular block with sugammadex in infants and children—a randomized study (2019) by Matsui M, Konishi J, Suzuki T, Sekijima C, et al. | RCT | 2-23 months | Orthopedic or plastic surgery | 22 25 25 | 1 mg/kg 2 mg/kg 4 mg/kg | - | 35.3 ± 15.1 35.5 ± 17.2 35.3 ± 14.8 | 129.1 ± 83.5* 70.3 ± 26.7 68.2 ± 34.5 | - | - |
| Reversal of rocuronium-induced neuromuscular blockade with sugammadex in pediatric and adult surgical patients (2009) by Plaud B, Meretoja O, Hofmoeckel R, Raft J, et al. | RCT | 28 days to 23 months | Surgery in supine position | 2 1 1 | 0.5 mg/kg 1mg/kg 2 mg/kg 4 mg/kg | 29 ± 11.2 | - | 222 ± 36 144 ± 42 36 42 | - | Viral gastroenteritis & hypoglycemia Vomiting Diarrhea & nasopharyngitis |
| Retrospective study of the restoration of neuromuscular blockage with sugammadex in newborns who used rocuronium (2019) by Turk HS, Kilinc L, Sayin P, Oba S | Case series | ≤ 40 days (10.2 ± 11.8) | Abdominal surgery | 27 | 3.6 [Range: 2-4 mg/kg] (11.2 ± 5.4 mg) | - | - | 88.1 ± 21 | 1 ± 0.6 | Vomiting & pharyngitis Vomiting, Pyrexia, rhinitis, & procedural complications None |

- There were 6 articles included in this study.
- One study showed the mean time to reach a TOF ratio of 0.9 was significantly longer when 1 mg/kg sugammadex was given compared with those given 2 mg/kg.
- No noted adverse events in 3 out of 4 articles, 1 article noted adverse events in the participants, but did not contribute it to sugammadex administration.

CONCLUSION AND RECOMMENDATION

Sugammadex is a safe and effective medication for the reversal from rocuronium-induced neuromuscular blocks in infants less than 24 months. A dose of 4 mg/kg sugammadex for the reversal from deep neuromuscular block was recommended.

KEYWORDS

Sugammadex, rocuronium, neuromuscular blockade reversal (non-MeSH), infants, pediatrics, general anesthesia