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Original Research Article

Comparative Evaluation of Sugammadex and Neostigmine for Reversal of Rocuronium-Induced Neuromuscular Block

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Abstract:

Background: Rocuronium-induced neuromuscular blockade (NMB) is widely used in anesthesia but carries the risk of residual neuromuscular blockade (RNMB), leading to postoperative complications. Neostigmine is traditionally used for reversal but has delayed onset and muscarinic side effects. Sugammadex offers rapid and selective reversal of aminosteroid NMBAs.

Aim: To compare the efficacy and safety of sugammadex versus neostigmine for reversal of rocuronium-induced NMB.

Methodology: In this prospective, randomized study, 80 adult patients undergoing elective surgery under general anesthesia were allocated to receive either sugammadex (2 mg/kg; n=40) or neostigmine with glycopyrrolate (0.05/0.01 mg/kg; n=40) for NMB reversal. Recovery times, extubation, post-anesthesia care unit (PACU) stay, and adverse events were recorded.

Results: Time to TOF ratio ≥0.9 was significantly faster with sugammadex (2.7 ± 0.9 min) than neostigmine (12.1 ± 3.0 min; p<0.0001). Extubation and PACU discharge occurred earlier with sugammadex (7.1 ± 1.8 vs 13.5 ± 3.2 min; 39.2 ± 9.4 vs 53.1 ± 11.6 min; p<0.0001). Adverse events were lower with sugammadex (12.5% vs 35.0%; p=0.018).

Conclusion: Sugammadex provides faster, more reliable reversal of rocuronium-induced NMB with fewer adverse events, supporting its use as a safer and more efficient alternative to neostigmine.

Keywords: Sugammadex, Neostigmine, Rocuronium, Neuromuscular blockade, Residual paralysis, TOF ratio.

Introduction

Neuromuscular blocking agents are an integral component of contemporary anesthetic practice. They play a critical role in facilitating tracheal intubation, optimizing surgical exposure, and ensuring adequate muscle relaxation during a wide variety of surgical procedures. The use of NMBAs enables anesthesiologists to achieve controlled paralysis, thereby enhancing surgical conditions and minimizing the risk of patient movement during delicate operations. Of the non-depolarizing neuromuscular blockers, rocuronium is an aminosteroid compound that has emerged as one of the most commonly used agents due to its rapid onset of action, intermediate duration, and favorable cardiovascular profile. These characteristics make rocuronium a preferred alternative to other agents such as vecuronium and atracurium, particularly in situations requiring rapid sequence induction or predictable recovery patterns.

Despite its widespread use and pharmacological advantages, rocuronium, like all non-depolarizing NMBAs, carries the risk of residual neuromuscular blockade within the postoperative period. RNMB is defined by the presence of neuromuscular weakness following anesthesia, usually evidenced by a TOF ratio less than 0.9. Clinically, this phenomenon is highly pertinent, as even mild degrees of residual blockade may impede upper airway muscle tone and reduce hypoxic ventilatory drive and protective airway reflexes. As a result of this, RNMB has been responsible for a wide range of respiratory complications in the postoperative period, which include hypoxemia, airway obstruction, aspiration, atelectasis, and delayed recovery from anesthesia. These complications go as far as increasing patient morbidity and prolonging PACU stay and healthcare costs. Therefore, safe anesthetic administration along with

postoperative care requires efficient and reliable neuromuscular blockade reversal. [1]

Traditionally, reversal of non-depolarizing neuromuscular blockade has been dependent upon the use of acetylcholinesterase inhibitors, with neostigmine being the agent most widely used. Neostigmine works by inhibition of acetylcholinesterase, which results in the buildup of acetylcholine within the neuromuscular junction. The resultant increase in available acetylcholine competitively displaces NMBA molecules from nicotinic receptors and thus restores neuromuscular transmission. While neostigmine has been in use for decades and is generally effective when appropriately administered, a number of important limitations have been identified. The onset of action of neostigmine is relatively slow, typically requiring 10–15 minutes to achieve adequate reversal. Furthermore, its efficacy is demonstrably affected by the depth of neuromuscular blockade at the time of its administration, where its efficacy is reduced during profound or deep blockades.

In addition to its pharmacodynamic limitations, neostigmine is associated with a range of muscarinic side effects resulting from increased acetylcholine at parasympathetic synapses. These adverse effects include bradycardia, hypotension, bronchospasm, increased salivary and bronchial secretions, nausea, and vomiting. Many undesirable effects are counterbalanced by the routine co-administration of an anticholinergic agent such as atropine or glycopyrrolate. Anticholinergics add unwanted variability to heart rate and hemodynamics, especially in patients with cardiovascular disease. Moreover, incomplete or unpredictable reversal with neostigmine has been well documented and contributes to a persistent incidence of RNMB in clinical practice, even when following standard dosing guidelines.[2]

Sugammadex represents a significant advance in the pharmacological reversal of aminosteroid neuromuscular blockade. It is a novel chemically modified γ- cyclodextrin, specifically designed to reverse the effects of rocuronium and vecuronium by a unique and selective mechanism. Unlike acetylcholinesterase inhibitors, sugammadex does not act by increasing the concentration of acetylcholine at the neuromuscular junction but rather by encapsulating free NMBA molecules in the plasma. This forms a stable, water-soluble complex that effectively inactivates the NMBA. Encapsulation decreases the free plasma concentration of rocuronium, which creates a diffusion gradient favoring withdrawal of the drug from the neuromuscular junction into the circulation, thereby producing a rapid and predictable recovery of neuromuscular function.

One of the most significant advantages of sugammadex is its ability to reverse neuromuscular blockade rapidly, even from deep or profound levels of blockade. Clinical studies have consistently demonstrated that sugammadex can restore a TOF ratio of ≥0.9 within 2–3 minutes, regardless of the depth of blockade at the time of administration. In contrast, neostigmine administered during deep blockades is wholly ineffective, and its use requires partial spontaneous recovery. The speed and reliability of sugammadex-mediated reversal have led to a substantial reduction in the incidence of RNMB and improved confidence in achieving complete neuromuscular recovery before extubation.[3]

The clinical consequences of a rapid and complete neuromuscular recovery are enormous. Faster reversal diminishes the chances of postoperative respiratory complications, enhances patient safety, and thereby improves the quality of recovery overall. From an operational point of view, reliable reversal can be associated with reduced PACU stay, better operating room efficiency, and easier patient throughput. These advantages are especially important in high-risk patient groups, such as the elderly, obese patients, and those suffering from obstructive sleep apnea or intrinsic pulmonary diseases, in whom even minor degrees of residual weakness may be highly compromising.

Despite these advantages, several issues have tempered widespread adoption of sugammadex. Foremost among them is its significantly higher cost compared with neostigmine, which creates significant challenges in resource-limited healthcare systems. Furthermore, though generally safe, rare but potentially serious adverse events related to sugammadex have been reported, including hypersensitivity reactions and anaphylaxis. Drug interactions, especially with hormonal contraceptives and certain anticoagulants, have also been described and need to be clinically considered. Indeed, compared to neostigmine, sugammadex is associated with fewer cardiovascular and muscarinic adverse effects, making it appealing in patients with cardiovascular instability or intolerance to anticholinergic drugs.[4]

Several comparative studies and meta-analyses have compared the efficacy and safety of sugammadex versus neostigmine to reverse rocuronium-induced neuromuscular blockade. These studies, as described above, consistently show a faster recovery profile of neuromuscular function, a decreased incidence of RNMB, and fewer postoperative respiratory complications in the PACU with sugammadex. Although its advantages in its recovery profile are clearly established, the degree to which this translates into reduced major morbidity or mortality is a matter of ongoing debate. Consequently, decisions for the drug of choice between sugammadex and neostigmine will thus be influenced by specific patient characteristics, the surgical context, institutional protocols, and economic considerations. For high-risk surgical populations, the benefits of a fast and reliable reversal may justify disadvantages in costs,

whereas the conventional drug neostigmine may continue to serve all low-risk cases.[5]

In the light of these considerations, this study aims to compare the efficacy of sugammadex and neostigmine for the reversal of rocuronium-induced neuromuscular blockades, with particular emphasis on the characteristics of recovery and the incidence of any adverse events. This will be essential to guide evidence-based decision-making and to optimize patient safety in anesthetic practice.

Methodology

Study Design: This study was designed as a prospective, randomized, comparative clinical study to evaluate and compare the efficacy and safety of sugammadex and neostigmine for reversal of rocuronium-induced neuromuscular block.

Study Area: The study was conducted in the Department of Anesthesiology, Jawaharlal Nehru Medical College & Hospital, Bhagalpur, Bihar, India.

Study Duration: The study was conducted over a period from July 2024 to June 2025

Sample Size: A total of 80 patients were included in the study. Patients were randomly allocated into two equal groups of 40 each:

- **Group S (Sugammadex group):** 40 patients received sugammadex for reversal of neuromuscular blockade.
- **Group N (Neostigmine group):** 40 patients received neostigmine with glycopyrrolate for reversal.

Sample Population: Adult patients undergoing elective surgical procedures under general anesthesia requiring neuromuscular blockade with rocuronium and subsequent pharmacological reversal were included in the study.

Inclusion Criteria

- Patients aged 18–65 years
- Patients belonging to American Society of Anesthesiologists (ASA) physical status I or II
- Patients undergoing elective surgical procedures under general anesthesia
- Use of rocuronium as the neuromuscular blocking agent
- Patients who provided written informed consent

Exclusion Criteria

- Patients with anticipated difficult airway or requiring rapid sequence induction
- Known hypersensitivity to sugammadex, neostigmine, or rocuronium
- Patients with severe hepatic, renal, or cardiac dysfunction
- Pregnant and lactating women
- Patients receiving drugs known to interfere with neuromuscular transmission (e.g., aminoglycosides, anticonvulsants)

Source of Data: The study population comprised patients undergoing elective surgical procedures under general anesthesia with rocuronium-induced neuromuscular blockade who required pharmacological reversal at the end of surgery.

Data Collection: Data were collected using a structured and pre-designed proforma. The proforma included demographic variables such as age, sex, and ASA physical status, details of the surgical procedure and anesthesia, neuromuscular monitoring parameters, type and dose of reversal agent administered, and time taken to achieve a train-of-four (TOF) ratio of ≥0.9. Intraoperative hemodynamic parameters including heart rate and blood pressure were recorded at predefined intervals. Postoperatively, patients were monitored in the recovery room for at least 60 minutes, during which any adverse events such as bradycardia, bronchospasm, nausea, vomiting, hypersensitivity reactions, or respiratory complications were documented. All collected data were verified for completeness and accuracy prior to statistical analysis.

Procedure: All patients were evaluated preoperatively to assess eligibility according to the inclusion and exclusion criteria. Written informed consent was obtained from each participant. Standard preoperative fasting guidelines were followed. In the operating room, routine monitoring including electrocardiography, non-invasive blood pressure, pulse oximetry, and capnography was instituted. Neuromuscular monitoring was performed using a peripheral nerve stimulator, with assessment of the TOF response at the adductor pollicis muscle following ulnar nerve stimulation.

General anesthesia was induced with intravenous propofol and fentanyl, followed by administration of rocuronium to facilitate tracheal intubation. Anesthesia was maintained using inhalational anesthetic agents such as sevoflurane or isoflurane in a mixture of oxygen and nitrous oxide, with additional opioids administered as required. At the end of the surgical procedure, upon reappearance of the second TOF count, patients were randomized to receive either sugammadex 2 mg/kg intravenously (Group S) or neostigmine 0.05 mg/kg combined with glycopyrrolate 0.01 mg/kg intravenously (Group N). The time to recovery of a TOF ratio of ≥0.9 was recorded. Patients were subsequently monitored in the postoperative recovery area for respiratory and hemodynamic stability and the occurrence of any adverse events.

Statistical Analysis: All data were entered into Microsoft Excel and subsequently analyzed using Statistical Package for the Social Sciences (SPSS) software. Quantitative variables were expressed as mean

± standard deviation and compared between the two groups using the independent Student's t-test. Qualitative variables were expressed as frequencies and percentages and analyzed using the Chi-square test or Fisher's exact test, as appropriate. A p-value of less than 0.05 was considered statistically significant."

Result

Table 1 compares reversal outcomes and adverse-event incidence between Sugammadex (n = 40) and Neostigmine (n = 40). Sugammadex significantly accelerated neuromuscular recovery, with a mean time to TOF ratio ≥0.9 of 2.7 ± 0.9 min versus 12.1 ± 3.0 min for Neostigmine (mean difference −9.4 min; 95% CI: −10.4 to −8.4; p < 0.0001). Extubation occurred faster with Sugammadex at 7.1 ± 1.8 min compared to 13.5 ± 3.2 min with Neostigmine (mean difference −6.4 min; 95% CI: −7.6 to −5.2; p < 0.0001), and PACU stay was shorter (39.2 ± 9.4 min vs. 53.1 ± 11.6 min; mean difference −13.9 min; 95% CI: −18.0 to −9.8; p < 0.0001). Additionally, the composite adverse-event rate was lower with Sugammadex (5/40, 12.5%) compared to Neostigmine (14/40, 35.0%), corresponding to a relative risk of 0.36 (95% CI: 0.14–0.89; p = 0.018). Overall, Sugammadex provided faster recovery with fewer adverse events than Neostigmine.

Table 1: Comparison of Reversal Outcomes and Adverse-Event Composite (N = 80)

Outcome	Sugammadex (n = 40)	Neostigmine (n = 40)	Effect size & 95% CI	Test
Time to TOF ratio ≥0.9 (min), Mean (SD)	2.7 (0.9)	12.1 (3.0)	Mean diff = −9.4 min (−10.4 to −8.4)	Welch t, p < 0.0001
Extubation time from reversal (min), Mean (SD)	7.1 (1.8)	13.5 (3.2)	Mean diff = −6.4 min (−7.6 to −5.2)	Welch t, p < 0.0001
PACU stay (min), Mean (SD)	39.2 (9.4)	53.1 (11.6)	Mean diff = −13.9 min (−18.0 to −9.8)	Welch t, p < 0.0001
Any adverse event (composite)*, n (%)	5 (12.5%)	14 (35.0%)	RR = 0.36 (0.14–0.89)	Chi-square, p = 0.018

Table 2 compares the recovery of neuromuscular function, measured by TOF ratio ≥0.9, between patients receiving Sugammadex (n = 40) and Neostigmine (n = 40). The mean time to achieve TOF ≥0.9 was markedly faster with Sugammadex at 2.7 ± 0.9 min versus 12.1 ± 3.0 min with Neostigmine, with a mean difference of −9.4 min (95% CI: −10.4 to −8.4; p < 0.0001). A high proportion of Sugammadex patients achieved TOF ≥0.9 within 3 minutes (37/40; 92.5%) compared to only 3/40 (7.5%) in the Neostigmine group (risk difference 0.85, 95% CI: 0.72–0.97; p < 0.0001). Similarly, within 5 minutes, 97.5% of Sugammadex patients versus 17.5% of Neostigmine patients reached TOF ≥0.9 (risk difference 0.80; 95% CI: 0.65–0.94; p < 0.0001). Notably, only 1 patient (2.5%) in the Sugammadex group took longer than 10 minutes compared to 31 patients (77.5%) in the Neostigmine group (RR = 0.03; 95% CI: 0.01–0.22; p < 0.0001). Overall, Sugammadex provided rapid and reliable recovery of neuromuscular function compared to Neostigmine.

Table 2: Time to Recovery of Neuromuscular Function (TOF ≥0.9) After Reversal (N = 80)

Measure	Sugammadex (n = 40)	Neostigmine (n = 40)	Effect size & 95% CI	Test
Time to TOF ≥0.9 (min), Mean (SD)	2.7 (0.9)	12.1 (3.0)	Mean diff = −9.4 min (−10.4 to −8.4)	Welch t, p < 0.0001
Achieved TOF ≥0.9 within 3 min, n (%)	37 (92.5%)	3 (7.5%)	Risk diff = 0.85 (0.72–0.97)	Z test, p < 0.0001
Achieved TOF ≥0.9 within 5 min, n (%)	39 (97.5%)	7 (17.5%)	Risk diff = 0.80 (0.65–0.94)	Z test, p < 0.0001
TOF ≥0.9 >10 min, n (%)	1 (2.5%)	31 (77.5%)	RR = 0.03 (0.01–0.22)	Fisher's exact, p < 0.0001

Table 3 presents the incidence of individual adverse events in patients receiving Sugammadex (n = 40) versus Neostigmine (n = 40). Bradycardia requiring treatment occurred in 1 patient (2.5%) in the Sugammadex group compared to 7 patients (17.5%) in the Neostigmine group, with a significant relative risk of 0.14 (95% CI: 0.02–0.99; p = 0.028). Postoperative nausea and vomiting (PONV) requiring treatment was lower in the Sugammadex group (5.0% vs. 22.5%; RR = 0.22, 95% CI: 0.05–0.92; p = 0.036). No patients in the Sugammadex group experienced bronchospasm, compared to 2 patients (5.0%) in the Neostigmine group (p = 0.49). Desaturation <92% in PACU occurred in 2.5% vs. 17.5%

(RR = 0.14; p = 0.028), and residual paralysis (TOF <0.9) was absent in the Sugammadex group but occurred in 6 patients (15%) in the Neostigmine group (p = 0.010). Hypersensitivity reactions were rare, with 1 case in the Sugammadex group and none in the Neostigmine group (p = 1.000). Overall, Sugammadex was associated with significantly fewer cardiovascular, respiratory, and neuromuscular complications.

Table 3: Incidence of Individual Adverse Events (N = 80)

Adverse event	Sugammadex (n = 40)	Neostigmine (n = 40)	Effect size & 95% CI	Test
Bradycardia requiring treatment, n (%)	1 (2.5%)	7 (17.5%)	RR = 0.14 (0.02–0.99)	Fisher's exact, p = 0.028
PONV (treated), n (%)	2 (5.0%)	9 (22.5%)	RR = 0.22 (0.05–0.92)	Fisher's exact, p = 0.036
Bronchospasm, n (%)	0 (0.0%)	2 (5.0%)	—	Fisher's exact, p = 0.49
Desaturation <92% in PACU, n (%)	1 (2.5%)	7 (17.5%)	RR = 0.14 (0.02–0.99)	Fisher's exact, p = 0.028
Residual paralysis (TOF <0.9 in PACU), n (%)	0 (0.0%)	6 (15.0%)	—	Fisher's exact, p = 0.010
Hypersensitivity reaction, n (%)	1 (2.5%)	0 (0.0%)	—	Fisher's exact, p = 1.000

Table 4 compares the overall recovery profile and perioperative outcomes between patients receiving Sugammadex (n = 40) and Neostigmine (n = 40). The mean time to achieve an Aldrete score ≥9 was significantly shorter in the Sugammadex group (13.1 ± 3.4 min) compared to the Neostigmine group (20.1 ± 4.7 min), with a mean difference of −7.0 min (95% CI: −8.6 to −5.4; p < 0.0001), indicating faster recovery. A higher proportion of patients in the Sugammadex group were discharged from PACU within 60 minutes (87.5% vs. 57.5%), with a risk difference of 0.30 (95% CI: 0.12–0.47; p = 0.004). Postoperative airway support in PACU was required in 1 patient (2.5%) in the Sugammadex group versus 5 patients (12.5%) in the Neostigmine group, though this difference was not statistically significant (p = 0.20). Only 1 patient in the Neostigmine group required re-intubation, while none in the Sugammadex group did (p = 1.000). Overall, Sugammadex was associated with faster recovery and earlier PACU discharge, with a trend toward reduced airway support requirements.

Table 4: Overall Recovery Profile and Perioperative Outcomes (N = 80)

Outcome	Sugammadex (n = 40)	Neostigmine (n = 40)	Effect size & 95% CI	Test
Time to Aldrete ≥9 (min), Mean (SD)	13.1 (3.4)	20.1 (4.7)	Mean diff = −7.0 min (−8.6 to −5.4)	Welch t, p < 0.0001
Discharged from PACU ≤60 min, n (%)	35 (87.5%)	23 (57.5%)	Risk diff = 0.30 (0.12–0.47)	Chi-square, p = 0.004
Post-op airway support in PACU, n (%)	1 (2.5%)	5 (12.5%)	—	Fisher's exact, p = 0.20
Re-intubation in PACU, n (%)	0 (0.0%)	1 (2.5%)	—	Fisher's exact, p = 1.000

Discussion

Our study has shown that sugammadex offers a significantly quicker and more predictable reversal of rocuronium-induced neuromuscular blockade compared with neostigmine. The difference in mean time to TOF ratios ≥0.9 was 2.7 minutes in the sugammadex group and 12.1 minutes in the neostigmine group, reflecting a clinically and statistically significant difference of −9.4 minutes. All these findings are in line with previous research findings such as that by Murphy et al. (2021) [6], where median recovery times were 3 minutes with sugammadex against 8 minutes with neostigmine, highlighting a very similar rapid reversal effect. Hurford et al. (2020) [7] also stressed that sugammadex surely gives faster reversal of aminosteroid-induced block at different depths of neuromuscular blockade, with fewer drug-related adverse effects; the findings of their research are in support of our results on the efficacy and safety of sugammadex being higher. Taken together, these studies emphasize that sugammadex regularly shortens recovery time compared with neostigmine, increasing workflow efficiency in the perioperative environment."

The proportion of patients with TOF ≥0.9 within 3 minutes was 92.5% in the sugammadex group versus 7.5% in the neostigmine group, and delayed recovery beyond 10 minutes occurred in only 2.5% of

patients given sugammadex compared to 77.5% in the neostigmine group. This predictability of reversal is also closely in line with data from Bologheanu et al. (2022) [8], who found that sugammadex can be relied upon to provide consistent and predictable recovery even from deep blocks whereas neostigmine shows great variability depending on the depth of neuromuscular blockade. There are parallel findings by Sayed Ibrahim and ELkhadry (2022) [9] that point out that in pediatric populations, sugammadex significantly allowed quicker extubation and discharge from the PACU, proving it capable of efficiency across a wide range of patients. In our series, the time for extubation was reduced by over 6 minutes, and the length of stay in the PACU was reduced by nearly 14 minutes. These are similar operational benefits to those reported in the literature, which also suggest potential cost offsets in spite of the higher acquisition cost of sugammadex (Illman et al., 2011; Schaller & Lewald, 2016) [10,11].

Safety endpoints also demonstrated a benefit with sugammadex. Overall adverse events were seen in 12.5% of the patients, as compared to 35% for neostigmine, with a lower incidence of bradycardia, postoperative nausea and vomiting, and desaturation. This is in concurrence with previous data that points out that neostigmine's muscarinic effects increase the chance of developing bradycardia and other autonomic side effects. In contrast, sugammadex does not possess any sort of cholinergic activity and therefore carries fewer complications (Deana et al., 2020) [12]. Similar to the recommendations of recent guidelines promoting the use of quantitative monitoring to ensure the TOF ratio ≥ 0.9 prior to extubation, our overall result of minimal residual paralysis was 0% vs. 14% with neostigmine (Jiang et al., 2022; Hristovska et al., 2018) [13,14]. Moreover, Han et al. (2021) [15] showed a correlation between improved early recovery if facilitated by sugammadex and a decreased incidence of postoperative pulmonary complications such as hypoxaemia and atelectasis, which aligns with safety tendencies observed in our population.

With the exception of rare events, including hypersensitivity or bronchospasm, which occurred infrequently in our study, both agents were generally well tolerated, consistent with pediatric and adult trials, which have demonstrated a low incidence of severe reactions with sugammadex. Specifically, as noted by Voss et al. (2022), no statistically significant differences in the incidence of PACU airway support or re-intubation rates were observed; however, point estimates favored sugammadex, indicating a trend in keeping with improved early recovery with decreased respiratory compromise noted in other studies (Hurford et al., 2020; Voss et al., 2022) 7,16. These data emphasize that the advantages of sugammadex are manifest primarily in rapid and predictable neuromuscular recovery, leading to smoother perioperative management rather than differences in rare severe events.

Our findings are in concord with the wider literature that stresses the role of pharmacologic reversal combined with quantitative neuromuscular monitoring as integral to ensuring patient safety. Works by Hristovska et al., (2018) [14] and Jiang et al., (2022) [13] emphasized that while sugammadex enables rapid recovery, monitoring is likewise crucial to prevent residual paralysis, which may be one of the reasons for postoperative respiratory complications. Taken together, these data confirm that sugammadex provides a more reliable route to complete recovery than neostigmine, particularly in settings where early extubation and reduced PACU time are clinically advantageous.

Overall, our comparative investigation into the efficacy of sugammadex and neostigmine confirmed that the former reliably provides quicker, more predictable, and safer reversal of neuromuscular blockade induced by rocuronium, irrespective of the depth of blockade. This finding has been supported by a number of studies from different populations and practice settings, thereby confirming a definite advantage of sugammadex regarding clinical efficacy and patient safety, and reinforcing the potential need to optimize neuromuscular monitoring with quantitative techniques as well.

Conclusion

According to the findings of the study, sugammadex definitely appeared to provide a faster and more reliable reversal of rocuronium-induced neuromuscular blockade compared to neostigmine. Patients treated with sugammadex recovered more rapidly from neuromuscular blockade, underwent earlier extubation, and spent less time in the post-anesthesia care unit. Sugammadex also significantly reduced the overall incidence of adverse events and certain specific ones, such as bradycardia, PONV, desaturation, and residual paralysis. The overall recovery profile and the results of perioperative outcomes favored sugammadex; thus, it is considered a safer and more efficient option for neuromuscular blockade reversal in the perioperative setting.

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