Sugammadex overdose? Randomized trial with 1 or 2 mg/kg of sugammadex to reverse moderate rocuronium-induced neuromuscular blockade

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Background and Goal of Study

The use of neuromuscular blocking agents has proved to be beneficial during general anesthesia. However, once the patient has been extubated, residual neuromuscular blockade becomes an undesirable and harmful effect¹. Sugammadex has proved to be a useful tool against rocuronium-induced residual neuromuscular blockade. The aim of this study is to demonstrate whether the use of intraoperative monitoring allows dose adjustment not only of rocuronium but also of sugammadex.

Materials and Methods

We designed a randomized, double-blind trial. Forty patients scheduled for elective laparoscopic cholecystectomy under general anesthesia were included. Neuromuscular blockade (NMB) was monitored using acceleromyography. Patients received intravenous propofol, fentanyl and rocuronium (0.6 mg/kg) for induction followed by propofol and fentanyl maintenance anesthesia. Low doses of rocuronium (0.15 mg/Kg) were used to maintain NMB. Patients were randomly allocated to receive sugammadex from a syringe with 20 mg/ml (**control group**) or 10 mg/ml (**study group**). After the surgical closure, the anesthesiologist used on-label dosage of sugammadex (2 mg/kg) for the reversal of moderate NMB, assuming they were always administrating the 20 mg/ml. Those patients with profound NMB were excluded. Statistical analysis was performed using Student's t-test, Fisher's test and linear regression.

Results and discussion

Finally, a total of 34 patients were included (18 in **control group** and 16 in **study group**). No statistically significant differences between groups were found neither in demographic data nor in NMB (**Table 1**). After sugammadex, T4/T1 recovered to 0.9 was 3,1 ±1,7 minutes in **control group** and 3,6 ±1,7 minutes in **study group** (p>0.05). **Figure 1**.

Reversal of moderate NMB by sugammadex can be achieved with lower doses (1 mg/kg) than those recommended on-label by using intraoperative NMB monitoring (**Figures 1 and 2**). These doses do not increase the time needed to reverse NMB. The monitoring guided administration of sugammadex could reduce costs and allow a more extended use of the drug.

TOF count	Group	
	Control	Study
1	6 (17.6%)	4 (11.8%)
2	5 (14.7%)	3 (8.8%)
3	1 (2.9%)	1 (2.9%)
4	6 (17.6%)	8 (23.5%)
TOF count	2.3 (1.2)	2.8 (1.3)
TOF ratio (T4/T1)	10.4 (21.5)	12.1 (18.3)

Table 1. Intensity of neuromuscular block just before administration of sugammadex. No significant differences were found between the 2 groups.

Figure 1. Box plot showing time to recovery after administration of sugammadex.

Figure 2. Linear correlation, dispersion of data points, recovery time and T4/T1 ratio.

Conclusion

Reversal of moderate NMB by sugammadex can be achieved with lower doses than those recommended by using intraoperative NMB monitoring.

References

1. Murphy G. Min Anest 2006; 72: 97-109