TYPE II DIABETES MELLITUS PROLONGS ROCURONIUM INDUCED NEUROMUSCULAR BLOCKADE IRRESPECTIVE OF GLYCAEMIC CONTROL

HACETTEPE
ÜNİVERSİTESİ

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Background:

- ❖ Type II diabetes mellitus (DM) can lead to decreased nerve conduction velocity as a result of segmental demyelination and partial degeneration of nerve fibers and loss of motor units (1,2).
- ❖ The aim of this study was to analyse the recovery from rocuronium and the risk of postoperative residual neuromuscular blockade (RNMB) in type II diabetic patients undergoing general anesthesia with sevoflurane.

Methods:

- ❖ December 2014 – May 2015.
- ❖ Prospective observational study design
- ❖ ≥ 18 year-old, ASA I-II-III patients, abdominal surgery
- ❖ Monitoring: NIBP, ECG, SpO₂, etCO₂, BIS, TOF
- ❖ Anesthesia induction: 2.5 mg/kg propofol, 1 mcg/kg fentanyl, 0.6 mg/kg rocuronium bromide
- ❖ Anesthesia maintenance: sevoflurane 2% in 50% O₂/air + remifentanil infusion
- ❖ Main parameters:
 - ❖ Time to reappearance of T1, T2, T3 and T4 and time to reach TOF ratio of 0.7 and 0.9 after rocuronium injection
 - ❖ TOF ratios in PACU at 5th and 10th minutes of arrival
 - ❖ Correlation between glycemic control and the risk of RNMB (HbA1c)

Results:

- ❖ 82 patients (Group DM: 48, Group non-DM: 34)
- ❖ No difference between groups according to demographic data and other characteristics that can effect neuromuscular blockade.
- ❖ Extubation and eye-opening times were significantly longer in Group DM ($p < 0.001$).
- ❖ Times to reappearance of T1, T2, T3, T4 and to reaching a TOF ratio of 0.9 were significantly longer in Group DM (Table 1).
- ❖ Although there was no difference between the TOF ratios at the arrival to the postoperative care unit, TOF ratios of Group DM were significantly lower at 5th and 10th minutes at postoperative care unit (PACU) (Table 2)
- ❖ Difference in TOF ratios at PACU were regardless of the type of the reversal agent (neostigmin/ sugammadex) used to antagonize neuromuscular blockade.
- ❖ Poor glycaemic control was found not to affect the risk of RNMB.

Conclusion

Even in the absence of known neurologic complications; the neuromuscular blockade effect of rocuronium is longer and the risk of RNMB is higher in type II diabetic patients irrespective of the degree of glycaemic control.

Table 1. Time to appearance of T1, T2, T3, T4 and to reaching TOF ratios of 0.7 and 0.9

Time (min)	Group DM (n=48)	Group NDM (n=34)	p
T1	42 (15-160)	35 (15-90)	0.007
T2	60 (20-210)	45(30-130)	0.001
T3	76.5 (30-210)	55 (35-190)	0.008
T4	87.5 (45-220)	63.5 (40-200)	0.016
TOF 0.7	117.5 $\pm$ 48	102.7 $\pm$ 47.8	0.173
TOF 0.9	138 (50-240)	86 (55-220)	0.017

Table 2. TOF ratio at PACU

Neostigmin for reversal of NMB (n=52)

	Group DM (n=31)	Group NDM (n=21)	p
TOF-5 th min	0.91 (0.59-1)	0.94 (0.9-1)	0.001
TOF-10 th min	0.91 (0.7-1)	0.96(0.92-1)	0.000

Sugammadex for reversal of NMB (n=30)

	Group DM (n=17)	Group NDM (n=13)	p
TOF-5 th min	0.89 (0.7-1)	0.92 (0.9-1)	0.043
TOF-10 th min	0.92 (0.87-1)	0.94 (0.92-1)	0.183

Regardless of reversal agent (n=82)

	Group DM (n=48)	Group NDM (n=34)	p
TOF-5 th min	0.91 (0.59-1)	0.94 (0.9-1)	0.001
TOF-10 th min	0.92 (0.7-1)	0.96 (0.92-1)	0.001

Discussion:

- ❖ Vecuronium induced NMB has been shown to be affected in type II DM patients. However, the studies conducted with rocuronium, which has a more rapid onset of action and recovery profile, reveal controversial results (2).
- ❖ Age, BMI, glycaemic control, insulin usage, type of the anesthetic drug and existence of subclinical neuropathy are among the factors that are discussed to affect the duration of NMB in diabetic patients (1,2).

References

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