Abstract *(in English – Times New Roman 12 - max. one page)*

Title: Alternative methods for calculating the TOF ratio obtained by acceleromyography: a comparison with electromyography. Preliminary results.

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Objective: To evaluate the precision and performance of acceleromyography (AMG) compared with electromyography (EMG) during neuromuscular blockade, and to determine whether analytical corrections (T4/T2, normalization and/or moving average) improve the accuracy and reliability of AMG.
Background: AMG has been used in clinical practice as a simple and inexpensive method of quantitative neuromuscular monitoring. However, two major limitations affect interpretation. First, the baseline train-of-four (TOF) ratio (T4/T1) frequently exceeds 1.0. This "overshoot" leads to systematic overestimation of recovery, compromising patient safety. Second, consecutive AMG TOF ratios show substantial variability, making isolated measurements difficult to interpret. EMG is a reliable alternative and has the potential to solve the two problems of AMG, but requires expensive electrodes (1). Strategies capable of improving AMG precision and performance would therefore be clinically relevant.
Methods: After Ethical Committee approval and written informed consent, 40 patients undergoing ENT surgery under intravenous propofol and remifentanil anesthesia were included. AMG and EMG TOF ratios were recorded simultaneously in the same hand of the same patients using a modified Stimpod NMS 450X. The fingers were fixed on a board not to interfere with the thumb movement. After 20 baseline measurements, neuromuscular blockade was induced with rocuronium 0.45 mg/kg and recovered spontaneously until a final baseline. The raw AMG TOF ratio (rAMG) was compared to simultaneous EMG. Modified TOF ratios were obtained as T4/T2 (2), T4/T1 normalized to the initial baseline (nAMG) (3), as a moving average of 5 consecutive measurements (AMGm), or their combination (nAMGm). The precision (inter-measurement variability) was presented as the mean of all baseline measurements with inter-patients SD and the intra-patient SD. The performance of AMG compared to EMG was determined using the Blant and Altman method (bias and Tolerance Limits) for the duration after rocuronium administration to reach TOF ratio 0.9, a clinically critical endpoint.
Results:

	TOF ratio initial baseline (%)			Duration TOF ratio 0.9 (min)		
	Mean	**Inter-patient SD**	**Intra-patient SD**	**Bias**	**Lower TL**	**Upper TL**
EMG	100,2	1,0	9.8			
rAMG	117	14,0	19,4	-10,1	-35,5	15,3
T4/T2	101.8	1,8	10,7	-9,5	-34,7	15,7
nAMG	100	0,1	16,2	-3,8	-31,9	24,4
AMGm	119,7	15,4	7,6	-9,2	-34,1	15,7
nAMGm	102.2	0,7	6,5	-3.5	-31,4	24,3

Conclusions: The rAMG demonstrated a high baseline TOF ratio and variability; both T4/T2 and normalization + moving average could reduce the baseline overshoot and variability to the EMG level. The normalization of the recovery TOF ratios to the initial baseline has the potential to improve the performance of AMG (lower bias with EMG at the time of TOF ratio 0.9 recovery) but wide limits of agreement remain.

References:

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