

**Title:** ASSESSMENT OF THE EVOKED ACCELERATION RESPONSE DURING RECOVERY FROM VECURONIUM AND ATRACURIUM INDUCED BLOCK

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**Introduction.** Conventional objective monitoring systems of the neuromuscular transmission (NMT) are either based upon analysis of evoked electrical activity (EMG) or upon mechanical determination of the evoked contractile response, by a force displacement transducer (FDT). Neither system have gained wide acceptance in anesthetic practice, the EMG method being strained by an intricate computing of the compound electrical signal, and the FDT method by the necessity of isometric conditions of registration. One of the authors (JVM) has, in collaboration with Biometer A/S (Denmark), developed a new method of NMT monitoring, intended for routine use, containing an acceleration responsive transducer (ACT). A bicenter study was undertaken, investigating the accuracy of this system with a FDT based system of reference, during recovery from vecuronium or atracurium induced block.

**Methods.** Fiftyfive adults, ASA I-II, undergoing elective surgery in thiopentone-fentanyl-halothane-N<sub>2</sub>O-vecuronium anesthesia (group 1, n=30) or in thiopentone-droperidol-fentanyl-N<sub>2</sub>O-atracurium anesthesia (group 2, n=25) were studied, with informed consent and approval of the Ethical Committees of the two hospitals involved. Anesthesia was carried out during normoventilation and normothermic conditions. Spontaneous recovery and neostigmine or edrophonium induced reversal were studied. Supramaximal train-of-four (TOF) stimuli were delivered to the ulnar nerves. At one arm the isometric adductor pollicis tension response was measured with a Myograph (MG) 2000. At the other arm a 5x10 mm ACT, containing a piezo-electric ceramic wafer, generating a voltage potential during changes in velocity, was fastened to the volar side of the interphalangeal joint of the thumb. The signals were conveyed to two MG 2000 monitoring units for display and recording of TOF-ratios (T<sub>4</sub>/T<sub>1</sub>), which were subsequently analyzed by a computerized method of linear regression.

**Results.** Regression analysis of corresponding TOF-ratios (Table 1) demonstrated a good correlation between the transducers. The number of TOF-ratio observations was in mean (range) in group 1, 9.9 (7-11) and in group 2, 16.9 (11-27). No statistical significant difference ( $p>0.2$ ) between the number of T<sub>4</sub> registrations of the transducers was found. The slope values (b)(s.e.b.=0.02) indicate the marginal offset from line of identity (Fig.).

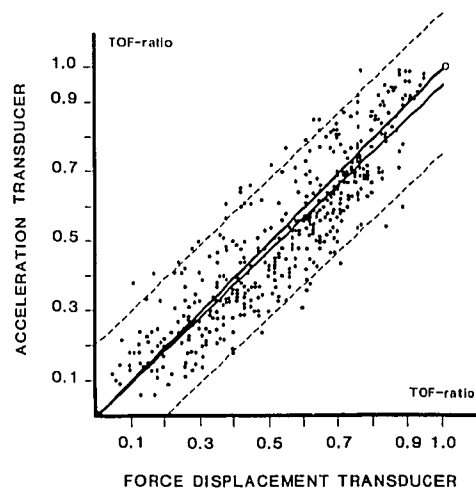
**Discussion.** The introduction of the immediately acting nondepolarizers, vecuronium and atracurium, with their rapid but still inherent variable rate of recovery, has increased the interest in a simple and reliable method of NMT monitoring. The set up of the ACT system, not depending on a rigid suspension device, proved easier and less time consuming than producing stable isometric FDT registrations. Our observations show a close correlation between the results obtained with the two systems. These preliminary results suggest that an important clinical monitoring potential of the ACT method can be foreseen.

#### Reference.

1. Viby-Mogensen J. Clinical measurement of neuromuscular function: An update. In: Clinics in Anesthesiology, Edited by Norman J, WB Saunders Company; 3: 467-482, 1985.

Table 1. Regression data on TOF-ratios (ACT=y values, FDT=x values,  $p<0.0001$ )

Group	n	obs.	y-intcpt.	b	s.e.e.	r
1	30	297	-0.02	1.09	0.09	0.95
2	25	422	0.01	0.94	0.10	0.89



A scatterdiagram of corresponding TOF-ratios of the ACT and FDT in group 2 (422 observations). Lines of identity (-) and of regression analysis with 95% confidence limits are shown.