Title: IS THE RELAXOGRAPH® (NMT-100) A RELIABLE PEDIATRIC MONITOR OF NEUROMUSCULAR TRANSMISSION?

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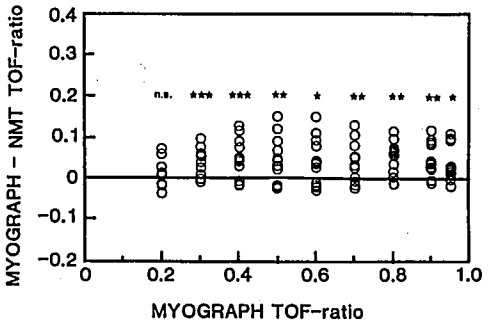
The Relaxograph® (NMT-100, Datex) uses the integrated evoked EMG response for monitoring of neuromuscular transmission. A constant current nerve stimulator incorporated in the monitor delivers a pulse of 100 μs duration. The aim of this study was to evaluate if the monitor in the automatic calibration mode (0-70 mA) delivers supramaximal nerve stimulation.

Following institutional approval and informed consent from the parents 14 children (ASA physical class I-II, 6.1 ± 2,5 years, 19,5 ± 4,0 kg)(mean ± 1 S.D.) undergoing elective surgery were studied. Endotracheal anesthesia was induced with thiopental and succinylcholine, and maintained with isoflurane in N_2O/O_2. Isometrical thenar EMG and force responses were measured at the left arm with the NMT-100 and the Myograph® (MG, Biometer) using ulnar nerve stimulation delivered by surface electrodes (Datex 57267) at the wrist. Thirty minutes after the administration of succinylcholine baseline values were considered stable. After force measurements of control twitch heights (TO) in the calibrated mode and with a supramaximal stimulus (200 μs, 60 mA) from the MG, atracurium (0,3 mg/kg) or vecuronium (0,05 mg/kg) was administered. During spontaneous recovery, force responses were measured alternating continously between five train-of-four (TOF, 3 c.p.m.) stimuli delivered by the NMT and five TOF stimuli (3 c.p.m) delivered by the MG.

TOF recovery data for each individual and for each stimulation mode were analyzed against time by best fit polynomial regression analysis ($r^2 > 0.97$). Corresponding datapoints for NMT stimulation and MG stimulation were derived from these regression lines. A paired Student's t-test was used to assess statistical significance ($P < 0.05$). Results are expressed as mean ± 1SD.

In twelve individuals the initial TO in the calibrated mode was less than 95% of the supramaximal TO obtained with the MG. The TO in the calibrated mode was 82 ± 11% of the supramaximal MG value and after complete recovery 80 ± 13% ($P > 0.5$). Figure 1 illustrates the differences in calculated TOF-ratio measurements between supramaximal MG stimulation and NMT stimulation plotted against corresponding MG values (n=118, n/patient=8.4 ± 0.5). Thenar skin temperatures during measurements were 34.2 ± 1.0 C.

Our results demonstrate that the Relaxograph® NMT - 100 monitor does not consistently deliver supramaximal stimulation. The data also indicate that the intensity of stimulation significantly affects TOF-fade during spontaneous recovery from a non-depolarizing block.



(n.s. non significant, * $P < 0.05$, ** $P < 0.01$, *** $P < 0.005$)

A914

TITLE: THE FREQUENCY OF RESIDUAL NEUROMUSCULAR BLOCKADE FOLLOWING ATRACURIUM(A),VECURONIUM(V) AND PANCURONIUM(P). A MULTICENTER RANDOMIZED STUDY.

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In non-randomized studies a frequency of postoperative residual neuromuscular blockade (RNB) of 4-42% has been found depending on the neuromuscular blocking (NMB) agent administered (1). The aim of this study was to compare the frequency of RNB following A, V and P in a randomized multicenter study. The study included 540 ASA 1-2 patients (6 centers each contributing with 90 patients) scheduled for elective upper or lower laparotomy. No restrictions were given as to the type of anaesthesia (i.v. or inhalation) or the use of succhinylcholine for tracheal intubation. In each center patients were randomly allocated to recieve A(30pt), V(30pt) or P(30pt). Doses of NMB were given according to the normal practice, which did not include a nervestimulator. Administration of neostigmine was decided upon by the anaesthetist. Immediately after arrival in the RR nasal O_2 was given, and the TOF ratio was recorded by measurement of acceleration from the thumb. Patients with a peripheral temperature below 32°C were excluded. TOF ratios were recorded every 5th min untill a TOF ratio of 0.7 was reached. Supplementary doses of neostigmine were given if TOF ratio was below 0.5 or if TOF ratio was between 0.5 and 0.6 and p_aO_2 or p_aCO_2 were abnormal.

RESULTS: So far 488 pt have been included (A 171 pt, V 158 pt, P 159 pt). There was no difference between the 3 groups with respect to weight, age, administration of succinylcholine or neostigmine, duration of operation or anaesthesia, time from administration of neostigmine or end of operation and to end of anaesthesia or time from end of anaesthesia to first TOF recording. The frequency and degree of RNB and the duration of RNB in the RR following A, V and P are shown in fig. 1 and 2 respectively.

CONCLUSION: RNB is much more frequent and lasts longer following P compared to V and A.

Ref: Anesthesiology 69: 272-276, 1988.

Fig. 1 TOF-ratio at arrival in the recovery room

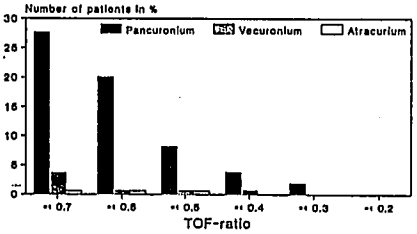

Fig. 2 Duration of residual neuromuscular blocade in the recovery room