Title: Increased Muscle Tone from High Dose Alfentanyl is a Peripheral Effect
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Introduction

Alfentanyl, when administered in high doses,has been described to cause the "wooden chest syndrome". This phenomenon is thought to be a CNS mediated process. While administering high dose alfentanyl to patients undergoing vaginal hysterectomy and monitoring train of four (TOF) responses we noted that the TOF increased as the alfentanyl infusion started. We suspected that the increased TOF is a peripheral response and conducted the following study.

Methods

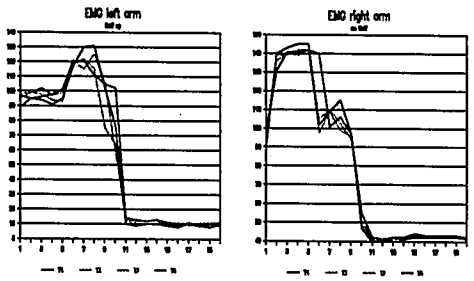
The study protocol was approved by the Committee on the Conduct of Human Research and informed consent was obtained from patients (ASA I or II). The patients were not pre-medicated. In addition to the usual monitors, integrated EMG monitors (Puritan Bennett NMT 221) were applied to both arms. The serial outputs of the NMT monitors were linked to two IBM/PC compatible computers that display T1 and T4 as two separate histograms. The data was also recorded on two disk files for further processing. An intravenous line was started in one arm. The opposite arm had two blood pressure cuffs applied, one for an automatic non-invasive device and the other for manual inflation. Once the baseline blood pressure was obtained, the manual cuff was inflated to 50mmHg above the systolic pressure. Alfentanyl infusion (120ug/kg) was then begun. The EMG response to a TOF stimulation was elicited every 20 seconds. When the alfentanyl bolus infusion was complete, Vecuronium (0.08mg/kg) was administered to facilitate endotracheal intubation.

Results

The cuffed arm showed no change in TOF with Alfentanyl infusion. The response of the uncuffed arm demostrated a steady rise in TOF up to 30% above the baseline values. The same pattern was observed in all the study subjects.

Discussion

Our results showed that the EMG response in the arm that did not receive alfentanyl had a normal TOF response and the arm with large amounts of alfentanyl had an increased TOF response until a muscle relaxant is administered. We conclude that this phenomenon is a result of the action of alfentanyl on the neuromuscular junction and is not mediated in the central nervous system since we did not observe any changes in TOF in the cuffed arm.



COMPARATIVE EFFECTS OF RYANODINE-HALOTHANE ON THE RESTING TENSION OF MUSCLE IN NORMAL PATIENTS AND PATIENTS SUSCEPTIBLE TO MALIGNANT HYPERTHERMIA

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Introduction : It has been suggested that a defect in the Ca2+ release channels (CRC) from the sarcoplasmic reticulum (SR) might be the basic defect in Malignant Hyperthermia (MH) (1). These CRC may be activated by either halothane (H) or µM concentrations of ryanodine (R) (2). This in vitro study has compared the effects of R with H on human MH susceptible muscle and normal muscle.

Methods : "Five" MH susceptible patients (MHS) and 8 MH non susceptible patients (MHN) were investigated with informed consent and approval by the Research Comittee (Univ. of Toronto). The concentracture methods were previously described for the MH diagnostic procedures (3). Additionnal muscle strips were tested with 1 % H alone and 0.1 µM R in the presence of 1 % H. Statistical analysis was performed using student's t test.

Results : (Table I) : No contracture was observed with 1 % H alone in the 2 groups. A 30 min exposure to R in the presence of H induced a significant contracture of the MHS muscle strips. In contrast, no significant contracture was observed in normal muscle.

Discussion : exposure to R + H enables human MHS muscle to be distinguisbed from normal muscle. These results indicate that the CRC from SR might be involved in the MH defect. However, the extremely slow effects of R indicate that the R + H contracture testing probably cannot help the in vitro determination of MH susceptibility.

references :
1) J. Biol. C. Hem. 264 / 1715-1722, 1988
2) Nature 331 : 314-316, 1988
3) Anesth. Analg. 69 : 511-515, 1989

Patients	N	1 % H	1 % H + 0.1 MR
MHN	8	0	0.06 ± 0.07
MHS	5	0	1.10 ± 0.45*

Table I : changes in tension (g) with 1 % H + 1 µMR on MHS and MHN muscle strips. Values are means (±SE)

* P < 0.05 compared with MHN