POSTER SESSION IX

A808

TITLE : SUCCINYLCHOLINE DOSE-RESPONSE IN HYPERPARATHYROIDISM

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Introduction: The calcium ion plays an important role in neuromuscular (NM) transmission [1]. Patients with disorders of calcium homeostasis respond abnormally to neuromuscular blocking drugs : Primary Hyperparathyroidism (HPT) has been shown to interfere with Vecuronium NM blockade [2,3] but response to Succinylcholine (SC) in HPT is poorly documented [4]. This study was designed to establish the SC dose-response relationships (ED50, ED 90 and ED 95) in patients with HPT and to determine whether these differ from normal patients.

Methods: After informed consent and ethical committee approval, 18 patients (ASA I or II) were studied: 9 with HPT scheduled for parathyroidectomy and 9 Controls. Premedication consisted of oral Hydroxyzine (3 $mg.kg^{-1}$). Anesthesia was induced with Thiopental (6-8 $mg.kg^{-1}$) and Fentanyl (2-3 $mcg.kg^{-1}$). Tracheal intubation was performed after topical anesthesia. Anesthesia was maintained with N2O 60 % and supplemental doses of Fentanyl. Esophageal temperature was maintained at 35.5-36.5°C and peripheral skin temperature of studied arm at 33-35.5°C. End tidal PCO2 was maintained at 30-35 mmHg. Supramaximal stimuli of 0.2ms duration were delivered, in a train-of-four (TOF) sequence, to the ulnar nerve at the wrist. Stimulation sequences were repeated every 12 s and mechanical evoked response of the adductor pollicis was measured. When stable neuromuscular responses was obtained, blood samples were collected to measure plasma ionized calcium . Then, the dose-response curve was performed according to cumulative dose response (CDR) technique during a SC infusion [5]. The NM blockade was maintained at 90% of baseline value by adjusting the rate of a infusion of SC. The steady state dose requirement (SSDR) was determined 5 min after the start of infusion. The interval between 75 and 25% block during recovery (RI 25-75) was measured after the infusion has been stopped. A log-logit analysis of the dose-response datas was performed. Individual dose response regression lines were calculated and Effective Doses for 50 90 and 95% of block were derived. Mean values of these were obtained for both groups and compared. Results were analyzed using a Mann and Whitney U test .The differences were considered significant when $p < 0.05$.

Results: No complications were associated with the administration of SC in HPT group and Controls. Plasma ionized calcium concentrations were respectively (mean ± SD): 3.14 ± 0.34 $mEq.L^{-1}$ and 2.33 ± 0.05 $mEq.L^{-1}$ (normal values: 2.4-2.60 $mEq.L^{-1}$). The ED values are shown in the Table: differences between groups are significant. Time to complete CDR curves was longer with HPT than with Controls (244 ± 64 vs 197 ± 77 sec, NS). In HPT, more dose increments were required to produce equivalent blockade (3.67 ± 1 vs 2.67 ± 1, $p < 0.05$). SSDR and RI 25-75 were not significantly different: 5.77 ± 1.1 vs 5.12 ± 1.1 mg/kg/h and 102 ± 55 vs 141 ± 54 sec, for HPT and Controls respectively.

Table:	Controls	Hyperparathyroidism
ED 50 (mg/kg)	0.15±0.11	0.27±0.04**
ED 90 (mg/kg)	0.26±0.06	0.40±0.04*
ED 95 (mg/kg)	0.32±0.05	0.46±0.05*

(mean ± CV) * $p < 0.05$ ** $p < 0.01$ vs Controls

Conclusion: This study shows that ED 50 , ED 90 and ED 95 for SC, using CDR technique with infusion, are respectively 1.8, 1.5 and 1.4 more important for patients with HPT and hypercalcemia than for Controls. Values for ED 50 and ED 90 among controls are in agreements with those previously reported [5]. SSDR and recovery were not different: these last results are not consistent with the case report of Al-Mohaya et *al* [4] who described a patient with HPT in whom the duration of SC induced blockade was longer than expected: but plasma cholinesterase activity has a low level . We conclude that, if a rapid sequence induction is required in a HPT patient with hypercalcemia, a 1.4 more important dose of SC may be needed to produce a rapid onset of excellent intubating conditions.

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A809

TITLE: THE EFFECT OF TEMPERATURE ON THE TWITCH RESPONSE OF THE RABBIT TIBIALIS ANTERIOR MUSCLE.

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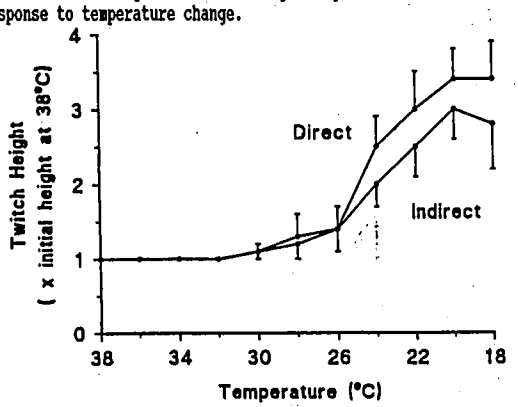
The result of experiments on the effect of cooling on human adductor pollicis[1] and dog tibialis anterior[2] contrast sharply with the effect of temperature on the in-vitro rat hemidiaphragm preparation, in which reduction of temperature is associated with an increase in twitch height[3]. We have investigated the effect of temperature on directly and indirectly elicited twitch in the the rabbit tibialis anterior in vivo.

New Zealand white rabbits were anaesthetised with fentanyl and fluanisone by i.m. injection followed by continous intravenous infusion. The trachea was intubated and the lungs ventilated with 100% oxygen. The twitch response of the tibialis anterior muscle to supramaximal stimulation at 0.1 Hz, either of the muscle directly (fully curarised) or (in other preparations) indirectly through the sciatic nerve, was measured with a Grass FT03 transducer, amplified and recorded on hard copy. The tibialis anterior was first cooled and then rewarmed over the range 38-18-38°C by surface cooling over the abdomen with ice or warming by radiant heat. The temperature of the tibialis anterior was measured by a thermocouple inserted into the muscle.

The figure shows twitch height (mean[SD]) as a proportion of the initial value at 38°C against temperature, for 6 directly stimulated and 6 indirectly stimulated muscles. For clarity the figure shows the results only during the cooling phase. Rewarming was associated, for any given preparation, with almost identical twitch heights obtained in reverse order to the cooling phase. Two sample t-testing shows a significant difference between direct and indirect twitch heights at 24°C ($p=0.05$) but the differences at 22, 20 and 18°C just fall short of significant in these samples.

These results are similar in pattern to those found in in the rat hemidiaphragm[3] but show even larger increases in twitch height with cooling. We interprete them as showing an increasing muscle response to cold coupled with a slight diminution in neuromuscular transmission. The inability to measure paired direct and indirect response at the same time in any one muscle coupled with the variability in direct twitch makes it difficult to show the diminution in neuromuscular transmission. The results underline the differences that exist in the effect of cold on neuromuscular function in different muscles in different species. They highlight the importance of measuring changes in direct muscle response when interpreting overall neuromuscular response to temperature change.



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