TITLE: COMPARATIVE NEUROMUSCULAR BLOCKING EFFECT OF PIPECURONIUM AND PANCURONIUM UNDER ISOFLURANE, N_2O/O_2 ANESTHESIA.

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Pipecuronium (PIP) is a long-acting non-depolarizing neuromuscular (NM) blocking agent. Under balanced anesthesia PIP is 20 to 30% more potent than Pancuronium (PAN). The neuromuscular blocking effects of clinically equipotent doses of PIP and PAN under isoflurane, N_2O/O_2 and fentanyl anesthesia were compared.

Twenty five patients (21 F) scheduled for elective surgery gave written informed consent to participate in this IRB approved study. Patients ranged in age from 18 to 54 years, weighed from 51 to 89 Kg and were ASA I-III. Patients with a history of renal, hepatic, metabolic, or NM disorders were excluded, as were morbidly obese patients. Premedication consisted of morphine and an antisialogogue 1-2 hrs prior to the scheduled surgery. Patients also received 7-10 ml/kg of D5LR in the OR immediately prior to induction of anesthesia with thiopental (3-6 mg/kg). Patients were then maintained on N_2O/O_2 (50/50) and isoflurane (1-1.5%) until a stable end tidal concentration of isoflurane (0.7-1%) was obtained. They then randomly received either PAN (100 ug/kg, N=13) or PIP (80 ug/kg, N=12) as a single IV bolus injected over 5 sec. The ulnar nerve was stimulated at the wrist using train-of-four stimulation every 10 sec and the mechanical twitch of the adductor pollicis muscle was measured. Maintenance of anesthesia was with isoflurane (ET= 0.5-1%), N_2O/O_2 (50/50), incremental doses of fentanyl (50 ug) as needed and appropriate doses of PIP and PAN. The T_1 was between 10-25% of the baseline prior to reversal with neostigmine 40 ug/kg up to a max of 2.5 mg and glycopyrrolate 0.5 mg. Data was analyzed by unpaired student t-test and is reported as mean ($\pm$ SD). A $P<0.05$ was considered statistically significant. There was no significant difference in the demographic data or in any of the measured NM parameters between the two groups. The maximum suppression of T_1 occurred in 3.1 (1) min in patients receiving PIP and 3.2 (0.6) min in patients receiving PAN. With PIP the start of recovery was 54.5 (25.3) min, 5% recovery was 74.6 (31.4) min and 25% recovery was 109.1 (35.7) min. The corresponding values for PAN were 57.3 (21.6) min, 73.4 (27) min and 88.9 (30.1) min. There was no significant difference between the two groups with respect to the recovery of T_1 or T_4/T_1 ratio up to 10 min following the administration of reversal agents. Therefore, under isoflurane (ET 0.5-1%), N_2O/O_2 (50/50) anesthesia, PIP (80 ug/kg) and PAN (100 ug/kg) have similar NM blocking characteristics.

Title: SENSITIVITY TO ATRACURIUM IN MYASTHENIA GRAVIS PATIENTS DURING TRUE REMISSION

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Introduction: Patients with myasthenia gravis (MG) show increased sensitivity to atracurium during a relapse.[1] Responses to non-depolarizing relaxants during remission are controversial.[2] We studied the potency of atracurium in two MG patients during true remission from their disease (i.e. asymptomatic while off all therapy).

Methods: Patient 1 was a 69-yr-old, 75 kg female scheduled for right hemicolectomy. She had had generalized MG for 18 yrs but had been in remission for the 3 yrs prior to this surgery. Patient 2 was a 37-yr-old, 80 kg female scheduled for laser laparoscopy. She had a 6-month history of generalized MG but had been in remission for one month prior to surgery. In both cases, anesthesia was thiamylal, N_2O/O_2 and fentanyl. Potent inhaled agents were avoided during the study period. The responses to supramaximal stimulation of the ulnar nerve at the wrist were recorded using an MMG (Grass FT10) in patient 1 and an integrated EMG (Datex 221) in patient 2. Following calibration of the monitors, small incremental boluses of atracurium were administered until 90-95% depression of T1/C was achieved.

Results: In patient 1, atracurium 5 mg (0.07 mg/kg) produced 90% T1/C depression and an infusion rate of 3 ug/kg/min was needed to maintain T1/C at 10% for the subsequent 2 hrs. In patient 2, atracurium 5 mg (0.06 mg/kg) produced 90% T1/C depression; subsequent relaxation being achieved using isoflurane.

Discussion: Despite being in clinical remission, both patients demonstrated increased sensitivity to atracurium, the ED90 values being approximately 25% of normal and even slightly less than those reported for MG patients during relapse.[1] Furthermore, the infusion rate needed to maintain T1/C at 10% in patient 1 represented 50% or less than that required in normal subjects.[3] We conclude that, unless proven otherwise, MG patients in remission should be considered sensitive to atracurium, and that in such patients smaller incremental doses should be titrated to quantified effect.

References:
1. Canad J Anaesth 36:402-6, 1989.
2. Anesthesiology 61:173-187, 1984.
3. Anesthesiology 59:237-240, 1983.