TITLE: ONSET, DURATION AND RECOVERY FOLLOWING HIGH DOSE VECURONIUM

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INTRODUCTION: Vecuronium was introduced as a neuromuscular blocking agent with an intermediate duration of action. It does not cause histamine release nor alter hemodynamics.[1] Studies have shown that the speed of onset and duration are dose-dependent.[2] This study was undertaken to assess the speed of onset, duration of action, and recovery following vecuronium 0.1, 0.2, 0.3 and 0.4 mg/kg when used during halothane anesthesia.

METHOD: Following Institutional Review Board approval, 40 consenting ASA 1 or 2 patients, of either sex and between the ages of 18 and 60, were entered into the study. All were free of hepatic or renal disease. They were randomly assigned to 4 groups of 10 patients each to receive 0.1, 0.2, 0.3 or 0.4 mg/kg of vecuronium.

Patients were premedicated with 5-10 mg of diazepam. Anesthesia was induced with a combination of 1-2 µg/kg of fentanyl followed by 4 - 7 mg/kg of thiopental. After loss of consciousness a Puritan Bennett Myograph 2000 EMG monitor was calibrated and a stable baseline obtained. The height of the first twitch (T_1) and the train of four ratio (TR) was recorded every 20 seconds. The designated dose of vecuronium was then administered and ventilation was controlled with 70% N_2O in O_2. Intubation was initiated when T_1 had fallen to 20% of control, and the intubating conditions were graded. Time for T_1 to reach 0% of control (onset) was measured.

Anesthesia was maintained with halothane (up to an inspired concentration of 0.5%), 70% N_2O and 30% O_2, and incremental doses of fentanyl to maintain adequate anesthesia. Recovery was allowed to proceed spontaneously, and the time for T_1 to return to 25% and 50% of control was recorded. If neuromuscular blockade had to be maintained for the surgical procedure, vecuronium 0.025 mg/kg was given whenever T_1 returned to 25% of control.

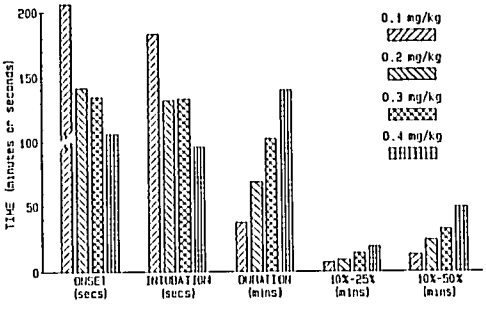
If spontaneous recovery was incomplete at the end of the procedure, neostigmine 0.04 mg/kg and atropine 0.02 mg/kg were given to reverse the non-depolarizing block. Both T_1 and TR were monitored during spontaneous and pharmacologically induced recovery.

Statistical analysis was performed using analysis of variance. $p<0.05$ was considered statistically significant.

RESULTS: Even at these high doses of vecuronium there was no significant variation in any hemodynamic parameter. Although intubating conditions were rated as good or excellent in all patients, increasing doses of vecuronium produced a statistically more rapid onset ($p<0.01$) and consequently intubation occured faster ($p<0.01$) (fig. 1). The duration of action was also statistically prolonged with increasing doses ($p<0.01$) (fig. 1). The time for the recovery of T_1 from 10% - 25% and in those cases that recovered spontaneously to 50%, was also prolonged with increasing doses ($p<0.01$) (fig. 1).

HIGH DOSE VECURONIUM
Comparison between doses
n=10 for each dose

Figure 1



DISCUSSION: This study clearly demonstrates that vecuronium, although introduced as an agent with an intermediate duration of action, can be utilized as a long acting neuromuscular blocking drug. When used in this manner it provides hemodynamic stability, and a rapid onset of action facilitating expiditious intubation. However, with increasing doses, there is a prolongation of spontaneous recovery of T_1 from 10 to 25% and from 10 to 50%.

REFERENCES

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