Title: THE HEMODYNAMIC EFFECTS OF MIVACURIUM CHLORIDE IN PATIENTS UNDERGOING CORONARY ARTERY BYPASS GRAFT DURING FENTANYL/VALIUM ANESTHESIA

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Introduction: Mivacurium Chloride (MCL) is a new short acting nondepolarizing muscle relaxant. Recently, completed studies in ASA I-II patients have established that bolus administration (over 5-10 sec) of MCL in doses up 0.15mg/kg had no significant effect on MAP or HR at 1,2 or 5 minutes post injection. Higher doses were associated with a fall in MAP in some patients. These changes were attenuated by administration of MCL over 30-60 sec. The purpose of this study was to determine the hemodynamic effects of bolus doses of MCL administered over 60 sec in ASA III patients undercoronary artery bypass procedures.

Methods: Twenty-six patients of either sex, ages 48-72 were studied after giving institutionally approved informed consent. Patients with exposure to antihistamines within 48 hours prior to surgery were excluded from the study. Within 7 days prior to surgery, all patients had a complete history, physical, blood chemistry analysis, CBC, Urinalysis, 12 lead EKG and assessment of NYHA Functional Class. These evaluations were repeated postoperatively. Therapeutic cardiovascular agents were continued up to the time of surgery. Patients were premedicated 1 hour prior to surgery with a combination of $MSO_4$ (5-15mg/IM) ± midazolam (0.03-0.1mg/kg/IM ± glycopyrrolate (0.1-0.3mg/IM). Hemodynamic monitoring was achieved using a femoral arterial line, IJ Swan Ganz catheter, and continuous EKG tracing. Anesthesia was induced with titrated doses of fentanyl and diazepam. Initial neuromuscular blockade was obtained with succinylcholine 1-1.5mg/kg IV. The study was initiated 10-15 minutes post intubation. All patients had been stable and had required no hemodynamic manipulations to the time of MCL injection. The following variables were recorded in triplicate at baseline: SBP, DBP, MAP, HR, RAP, PCWP, MPAP and CO (in duplicate). A baseline ABG and EKG tracing were also obtained. Calculated parameters included SV, SVR, PVR, and CI. A bolus of MCL was then administered over 60 sec into a rapidly infusing peripheral IV. Hemodynamic variables were rerecorded at 2,5, and 10 minutes after completion of the bolus. A repeat ABG was obtained at 4 min and a repeat EKG tracing at 10 min. Three doses were studied: 0.15mg/kg (Group I), 0.2mg/kg (Group II), and 0.25mg/kg (Group III). Results were analyzed using repeated measures ANOVA and paired t tests where appropriate.

Results: Hemodynamic results from Group I, Group II, and Group III are summarized in Tables 1,2 and 3 respectively. No clinically significant changes occurred in the ABG's, EKG tracings or laboratory studies. All patients did well perioperatively.

Discussion: In Group I, MCL administration was associated with hemodynamic stability in every patient. In Group II, MCL administration did not affect the stability of any hemodynamic variable on average; however, two patients in this group experienced transient hypotension (19 and 35% decreases in MAP) at 2 min post injection. In Group III, MCL administration was associated with a statistically significant average decline in MAP and SVR at 2 min. The decline in MAP was attributable to falls of 19% in 3 of the 9 patients in Group III. The remaining 6 patients had minimal decreases (0-5%) in MAP. All hypotensive episodes resolved rapidly (<60 sec) without requiring treatment and there were no associated cutaneous changes.

Conclusions: Doses of 0.20mg/kg or greater of MCL appear to cause sporadic hypotension. As the hypotensive episodes were associated with decreased SVR and increased CO, we ascribe the hypotension to transient vasodilation and not myocardial depression. The mechanism for the hypotension has yet to be clarified.

TABLE 1 GROUP I (n=8; 0.15mg/kg)

| | BASE | 2 | 5 | 10 |
|---|---|---|---|---|
| TIME (min) | | | | |
| MAP(mmHg) | 87±2 | 85±2 | 84±2 | 85±3 |
| HR(bts/min) | 56±3 | 54±3 | 52±3 | 51±3 |
| SVR(dy sec/cm$^5$) | 1311±148 | 1284±122 | 1305±120 | 1324±116 |
| CO(l/min) | 4.6±0.9 | 4.6±0.8 | 4.5±0.3 | 4.5±0.3 |
| PCWP(mmHg) | 21±2 | 19±2 | 19±2 | 19±2 |

TABLE 2 GROUP II (n=9; 0.2mg/kg)

| | BASE | 2 | 5 | 10 |
|---|---|---|---|---|
| TIME(min) | | | | |
| MAP(mmHg) | 75±4 | 69±4 | 76±3 | 79±5 |
| HR(bts/min) | 54±2 | 55±3 | 54±3 | 54±3 |
| SVR(dy sec/cm$^5$) | 1114±132 | 994±87 | 1148±132 | 1195±159 |
| CO(l/min) | 4.6±0.4 | 4.6±0.4 | 4.6±0.4 | 4.7±0.4 |
| PCWP(mmHg) | 19±1 | 18±2 | 19±2 | 19±1 |

TABLE 3 GROUP III (n=9; 0.25mg/kg)

| | BASE | 2 | 5 | 10 |
|---|---|---|---|---|
| TIME(min) | | | | |
| MAP(mmHg) | 88±5 | 80±4* | 87±6 | 89±6 |
| HR(bts/min) | 55±2 | 55±2 | 53±2 | 52±2 |
| SVR(dy sec/cm$^5$) | 1366±122 | 1226±114* | 1439±148 | 1449±139 |
| CO(l/min) | 4.5=0.3 | 4.6±0.3 | 4.3±0.3 | 4.4±0.3 |
| PCWP(mmHg) | 19±2 | 17±2 | 17±2 | 18±2 |

All values MEAN ± SEM

*sig. different from baseline $p < 0.05$

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