TITLE: AMRINONE, DOBUTAMINE, AND INTERACTION EFFECTS ON GUINEA-PIG HEART MUSCLE

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Amrinone and dobutamine are both effective inotropic agents with different mechanisms of action. The purpose of this study was to analyze the independent and interactive effects of amrinone and dobutamine on guinea-pig heart muscle.

After approval of the protocol by our Animal Review Committee, guinea-pig left atrium was prepared as described by Kobata[1]. Cumulative dose-response curves were completed for both amrinone and dobutamine in order to determine an appropriate ED_{50} for each. Heart muscle preparations were then randomized to receive (1) no drug, (2) dobutamine alone at ED_{50}, (3) amrinone alone at ED_{50} and (4) both amrinone and dobutamine at ED_{50}. Dependent variables were peak twitch tension, maximum dp/dt and maximum -dp/dt, measured before addition of drug(s) and at peak effect. Data were analyzed by two-way ANOVA for main effects and interactions and by one-way ANOVA for main effects and interactions and by one-way ANOVA for differences between groups. Significance was defined as $p<0.05$.

ED_{50} for dobutamine was 1.5×10^{-7} m/L, and ED_{50} for amrinone was 5×10^{-5} m/L. Two-way ANOVA revealed significant independent effects on peak twitch tension and max -dp/dt and significant independent and interactive effects on max dp/dt. Results of the one-way ANOVA for percent change in peak twitch tension are described in the Figure. Inotropic effects were significant in the dobutamine group, the amrinone group, and the combined group, but these effects were not significantly different among these three groups.

Although amrinone and dobutamine have different specific sites of action, the final common pathway for both is through the CAMP system. Amrinone and dobutamine have significant independent inotropic effects, but these effects are neither additive nor interactive in the isolated guinea-pig heart muscle.

References

[1] Clin Monit, 5:26-33, 1988.