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Effects of β_1-Blockade on Rate Pressure Product and Perceived Exertion During Exercise

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Over 15 million people in the U.S. are prescribed cardio-selective beta blockers. However, whether β_1-blockade impacts myocardial oxygen demand in combination with the perception of effort during large muscle dynamic exercise has not been explored. **PURPOSE:** To assess the effects of a cardio-selective beta blocker, esmolol (E), infusion during moderate (MOD) and heavy (HVY) intensity cycling exercise on rate pressure product (RPP) and rating of perceived exertion (RPE) in young, healthy women. We hypothesized that RPP would be lower and RPE would be higher during E compared to saline (S) treatment conditions during dynamic exercise in young women. **METHODS:** Thirteen healthy, normally active younger (20-32 yrs) women performed very light (20W warm-up), MOD (85% of estimated lactate threshold, LT) and HVY (50% between LT and the respiratory compensation point) recumbent leg cycling exercise during IV infusion of S and E in randomized order (45 min apart) on a single study visit. Heart rate (HR), brachial blood pressure (BP, automated cuff), RPE (Borg Scale), and VO_2 (indirect calorimetry) were measured during the fourth minute of each intensity. RPP (HR x systolic BP) was calculated. Repeated measures ANOVAs were used to determine differences in RPP, RPE, and VO_2 across intensities and treatments. **RESULTS:** A significant interaction effect for intensity*treatment on RPP was found. Pairwise comparisons revealed that RPP was significantly lower in MOD_E compared to MOD_S (12703±1809 vs 15954±3432, $p<0.001$) and HVY_E compared to HVY_S (16433±1864 vs 22155±4041, $p<0.001$). RPP was not different at rest (6782±1030 vs 7297±1273, $p=0.066$). A significant effect of both intensity and treatment was found on RPE, pairwise comparisons showed RPE in HVY_E was greater than HVY_s (14.7±1.4 vs 14.0±1.3, $p=0.011$). There was no effect of treatment on VO_2. **CONCLUSION:** These findings confirm the myocardial demand lowering effects of β_1-blockade in healthy humans and demonstrate perceived effort increases during high intensity exercise. **SIGNIFICANCE/NOVELTY:** The beneficial effects of β_1-blockade drugs may be complicated by the increased perception of effort during exercise, likely due to reduced oxygen delivery to active muscle.

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