Acute Blood Pressure Response to Aquatic and Land Treadmill Exercise

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ABSTRACT

PURPOSE: To determine the acute blood pressure response of aquatic treadmill (AT) exercise compared to land treadmill (LT) exercise. METHODS: 11 Subjects (6 male; 23 ± 2 years; 70 ± 1 inches; 164 ± 32 pounds) completed 3 to 5, 5-minute graded exercise stages (~20, 26, 32 $ml^{-1} \cdot kg^{-1} \cdot min^{-1}$ for stages 1, 2, and 3, respectively) up to 85% age predicted maximal heart rate on AT. Blood pressure (BP) was measured manually at the conclusion of each stage while subjects straddled the treadmill belt for 20-30 seconds. Heart rate (HR) and oxygen consumption (VO_2) were measured continuously. Within 3-5 days, subjects completed an equivalent exercise bout on LT with stages matched for VO_2. Resting BP and HR was measured with an automated BP cuff following 10 minutes of seated rest before exercise and every 3 minutes for 30 minutes during recovery. Pre-exercise BP was also measured manually following 5 minutes of standing on AT and LT immediately before exercise. A paired sample *t*-test was used to compare seated resting and pre-exercise standing measures between modes. Since all subjects completed at least 3 matched stages on each mode, a 3 (stage) x 2 (mode) ANOVA was used to analyze the dependent variables: VO_2, HR, SBP, diastolic BP (DBP), mean BP (MAP), pulse pressure (PP), rate pressure product (RPP), and oxygen pulse (OP). SBP, DBP, MAP, and HR during seated recovery were analyzed by an 11 (time) x 2 (mode) ANOVA. All values presented as mean $\pm$ SE. RESULTS: Seated resting measures prior to exercise did not differ between modes. Pre-exercise standing SBP was greater (AT: 118 ± 9; LT: 113 ± 8; $p = 0.05$) and HR was lower (AT: 64 ± 10; LT: 77 ± 12; $p < 0.05$) for AT relative to LT. During exercise, significant main effects for mode were found for DBP (AT: 65 ± 2; LT: 71 ± 2) and PP (AT: 81 ± 4; LT: 62 ± 4) with a trend toward significance in SBP (AT: 146 ± 4; LT: 135 ± 4; $p = 0.057$). Main effects for stage were significant for VO_2, HR, RPP, and OP. No interactions were significant. During recovery, main effects for mode were observed only for HR (AT: 87 ± 1; LT: 78 ± 1), while there was a main effect for time for DBP, MAP, and HR. CONCLUSION: Hydrostatic pressure from AT increases exercise SBP and may lower HR.