

Association between exercise blood pressure, Na⁺ ingestion and Cold Pressor Test: A Pilot Study

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The risk for developing hypertension is related to a variety of factors including age and body weight. Other relevant factors are salt sensitivity and autonomic dysfunction as demonstrated by response to the “Cold Pressor Test” (CPT). Our question, in some subjects, are exercise BP increases related to observed BP changes in the CPT and/or Na⁺ sensitivity tests? **PURPOSE:** To determine if an association exists between the blood pressure response to exercise, and the response to Na⁺ ingestion or CPT. **METHODS:** Eleven female and male healthy college aged subjects BP's were determined by auscultation at rest and each minute following each of the following conditions: ingestion of 5% NaCl, the CPT, completion of single leg anaerobic step test (step), and during the sub-maximal Astrand-Rhyming cycle test (AR). Conditions were randomized over 4-5 days, with at least 2 resting BP's on each testing day. This study was approved by the SFU IRB. **RESULTS:** Significant ($p < 0.05$) moderate (0.60-0.75) positive correlations were found between resting systolic BP, CPT, Na⁺ and step test BP responses. Additionally, positive correlations were found between step test and Na⁺ BP; CPT and Na⁺ BP. One way ANOVA ($F=95.30$ $p= 0.000$) with Tukey Post-Hoc Analysis revealed differences between Na⁺, Step and AR BP's, and between CPT, Step and AR BP's. T-Test revealed significant increases in BP in CPT, Na⁺, Step and AR. Four Subjects (36%) demonstrated CPT BP ≥ 15 mmHg. Three subjects (27%) demonstrated Na⁺ BP ≥ 15 mmHg and 2/7 (28%) of the CPT & Na⁺ responders had CPT and Na⁺ BP ≥ 15 mmHg. **CONCLUSION:** Visually, the exercise data do not suggest an abnormally high BP response to either exercise test. However, they do suggest some potential for a hyperactive response to intense exercise in some subjects who demonstrate a positive Na⁺ or CPT response. This is supported by the lack of association with the AR submaximal BP response where the system can respond via autoregulation to the exercise challenge.