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Oral Saline Consumption and the Exercise Pressor Reflex

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The average American consumes far more sodium than is recommended. Consuming high amounts of sodium may augment blood pressure (BP) responses to physical stress like exercise. Exaggerated BP responses to exercise are thought to be an early symptom of some cardiovascular diseases like hypertension. **PURPOSE:** This analysis contains two studies. The purpose of study one was to determine at what time point both blood plasma and serum sodium would be consistently elevated following sodium and water consumption. The purpose of study two was to examine if elevated plasma and serum sodium result in an elevated BP response to handgrip (HG) exercise and the cold pressor test (CPT). **METHODS:** Study 1: Eight participants drank 423mL of normal saline (sodium 154mmol/L) and had repeat blood draws every 30min for 3hr. Study 2: Sixteen different participants underwent two randomized data collection visits; an experimental (EXP) visit 90min following normal saline consumption and a control (CON) without saline consumption. At each visit beat-by-beat BP and heart rate were recorded during a 5min rest period followed by 2min of isometric HG at 30% maximal voluntary contraction. Two minutes of post exercise ischemia (PEI) were performed immediately following HG. After a ≥ 10 min rest, participants underwent a 2min CPT. **RESULTS:** Study 1: Both plasma volume ($+6.8 \pm 1.3 \% \Delta$) and serum sodium ($+3.5 \pm 1.3 \% \Delta$) were elevated ($p < 0.05$) at or before the 90min time point and remained elevated throughout the 3hr follow-up period. Study 2: There were no significant differences in mean arterial pressure (MAP) during HG (EXP: 17.4 ± 2.1 mmHg; CON: 19.1 ± 1.5 mmHg), PEI (EXP: 16.9 ± 2.9 mmHg; CON: 16.9 ± 1.9 mmHg), or the CPT (EXP: 20.3 ± 2.7 mmHg; CON: 20.9 ± 2.9 mmHg) between conditions ($P > 0.05$). MAP recovery from the CPT was significantly slower in the saline condition (1min recovery: EXP; 15.7 ± 2.0 mmHg, CON; 12.3 ± 2.2 mmHg, $P < 0.05$). **CONCLUSION:** The current data found no significant differences in cardiovascular responses during handgrip or the cold pressor test between conditions. However, a modest delay in the recovery of blood pressure was found following the cold pressor test during sodium and volume loading. This suggests acute salt and water consumption increases cardiovascular strain following an intense physical stressor.