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Effects of Oral Saline Consumption on Heart Rate Variability and Cardiovascular Baroreflex Sensitivity

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Large doses of dietary sodium raise blood sodium concentration and plasma osmolality resulting in increased water consumption and plasma volume. Acutely increased serum sodium concentration can increase sympathetic activity while increased plasma volume can load the baroreflex suppressing sympathetic activity and increasing parasympathetic activity. Therefore, the impact on autonomic nervous system activity of a simultaneous oral sodium and volume load is unclear. **PURPOSE:** To examine autonomic function and its control by the baroreflex in healthy adults following oral saline consumption. **METHODS:** Healthy subjects participated in two randomized data collection visits. During the experimental visit (EXP) participants orally consumed 423mL of normal saline (sodium 154mmol/L) and waited 90min before data collection. During the control visit (CON) no saline was consumed. Beat-by-beat systolic blood pressure, electrocardiogram derived R-R interval, and heart rate were recorded during 5min of supine rest. Heart rate variability was analyzed to assess resting autonomic function. Cardiovascular baroreflex sensitivity was analyzed using the sequencing method which analyzes cardiac cycles where R-R intervals and systolic blood pressure change in unison for at least four sequential beats. **RESULTS:** Twelve healthy participants (age 25.6 ± 1.0 years; body mass index 24.6 ± 1.1 kg/m²) were studied. Heart rate significantly decreased during EXP (60.3 ± 3.3 BPM) vs CON (63.6 ± 3.8 BPM, $p < 0.05$), with no condition effect on systolic blood pressure (EXP 117 ± 4.5 mm Hg, CON: 128.4 ± 6.7 mm Hg, $p > 0.05$). There were no significant differences between conditions for all sequences of cardiovascular baroreflex sensitivity (EXP: 24.92 ± 3.79 , CON: 22.34 ± 3.53 , $p > 0.05$). High frequency heart rate variability showed no significant difference (EXP: 3048.63 ± 789.08 ms², CON: 2963.88 ± 787.13 ms², $p > 0.05$). Low frequency heart rate variability (EXP: 2738.74 ± 590.07 ms², CON: 2761.61 ± 568.78 ms², $p > 0.05$) and low frequency to high frequency ratio (EXP: 1.10 ± 0.14 , CON: 1.78 ± 0.71 , $p > 0.05$) also showed no significant differences. **CONCLUSION:** This preliminary data suggests that although heart rate was suppressed by simultaneous sodium and volume loading, there were no differences in the control of, or resting levels of, autonomic activity.