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The Effects of Hyperhydration and Salt Loading on Bioelectrical Impedance Analysis Body Fat Estimates

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Bioelectrical impedance analysis (BIA) is a common and non-invasive method to evaluate body composition by measuring the electrical impedance of the body. Altering blood electrolyte concentration or blood volume may impact BIA measurements by directly influencing the electrical conductivity of the body. While dehydration and sweat induced electrolyte loss certainly impacts BIA, it is unclear how simultaneous hyperhydration and electrolyte loading effects BIA measurements. **PURPOSE**: To examine the effects of acute hyperhydration and salt loading on the impact of BIA derived body fat estimates. **METHODS**: Each participant ate a standardized meal followed by ≥4hr fast, prior to the experimental visit. Adequate hydration (urine SG ≤1.020) of each participant was confirmed prior to the start of the visit. Tanita TBF-300A BIA and a blood sample were performed at baseline and every 30min for 3hr following the consumption of 3.8 grams of table salt dissolved into 466mL of deionized water (sodium: 1500mg, 140mmol). All urine produced during the 3hr follow-up was collected to assess volume and electrolyte excretion. **RESULTS**: Seven healthy participants (3M/4W, 29±2 years, 67.0±4kg, urine SG 1.007±0.001, hemoglobin 13.7±0.2g/dL, hematocrit 45±1%, serum sodium 140.0±0.5mmol/L) were studied. Participants excreted 646±55mL of urine containing 17.1±6.8mmol of sodium during the 3hr follow-up period. Consumption of the salt water solution increased plasma volume 7.0±0.7% and serum sodium 1.3±0.4% with each statistically elevated above baseline during the time points ≥60min and ≥120min, respectfully (all $p<0.05$). Both body mass (+0.4±0.1kg) and BIA estimated body fat percentage (+0.6±0.2%) (both $p<0.05$) increased immediately and returned to baseline levels by 90min. Leg to leg electrical impedance was not affected by the consumption of the salt water beverage ($p=0.660$). **CONCLUSION**: This preliminary data suggests that when starting in a hydrated state, concurrent consumption of salt and water temporarily increases body mass causing an increase in body fat estimates. However, differences in temporal patterns suggest increased plasma volume with small elevations in electrolyte concentration does not directly affect bioelectrical impedance analysis body fat estimates.