TACSM Abstract

Effects of Fluid Consumption Volumes on Fluid Retention during Sodium-Aided Hyperhydration Protocols

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ABSTRACT

Numerous investigations have supported the use of sodium-aided hyperhydration to improve hydration status and exercise performance in the heat. Sodium-aided hyperhydration studies typically utilize fluid volumes ranging from 10 - 25 mL · kg bm^{-1}; however, optimum fluid consumption volumes have not been identified. While it may seem logical that larger fluid consumption volumes would promote greater hyperhydration, excessive expansion of plasma volume could stimulate high-pressure baroreceptors and promote excessive diuresis. **PURPOSE**: To compare the effects of different fluid consumption volumes on fluid retention during a sodium-aided hyperhydration protocol. **METHODS**: Urine excretion was measured during four separate sodium-aided hyperhydration protocols in thirteen male subjects (24 ± 4 yrs, 75.2 ± 9.5 kg, 177.0 ± 8.9 cm) who were free from known renal, digestive, and cardiovascular disease. Each protocol began with a complete bladder void and assessment of urine specific gravity (USG). Subjects then consumed one of four different isotonic volumes of sodium and water in three equal doses separated by 45 min. Total water consumptions for the four protocols were 20 mL · kg bm^{-1} (20), 15 mL · kg bm^{-1} (15), 10 mL · kg bm^{-1} (10), and 5 mL · kg bm^{-1} (5). Subjects remained in the lab for two hours following the consumption of the initial fluid-sodium dose and performed a measure bladder void every 20 min. USGs and total fluid retentions (total fluid consumed – total urine excreted) for each protocol were compared using separate, one-way, repeated measures ANOVA and Sidak post-hoc analyses. **RESULTS**: USGs for the four protocols were 1.009 ± 0.005 (20), 1.010 ± (0.002), 1.016 ± 0.028 (10), and 1.009 ± 0.005 (5) ($P > 0.90$), indicating that all subjects were well and similarly hydrated for each protocol. Fluid retentions for the four protocols were 10.8 ± 2.7 mL · kg bm^{-1} (20), 7.5 ± 2.3 mL · kg bm^{-1} (15), 5.6 ± 2.5 mL · kg bm^{-1} (10), and 2.6 ± 1.4 mL · kg bm^{-1} (5) ($P \leq 0.04$). **CONCLUSION**: Subjects retained approximately 50% of the fluid that they consumed regardless of their fluid consumption volumes. These results suggest that, when consuming 5 – 20 mL · kg bm^{-1} of fluid during sodium-aided hyperhydration protocols, fluid retention levels increase linearly with an increase in fluid consumption volumes and, to attain the highest level of hyperhydration, at least 20 mL · kg bm^{-1} of fluid should be consumed.