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Influence of bottled water on rehydration following a dehydrating bout of cycling exercise

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Background

The purpose of this study was to compare the ability of two types of bottled water to rehydrate cyclists following a dehydrating bout of cycling exercise. It was hypothesized that rehydration would occur faster and/or more completely following the consumption of bottled glacier water supplemented with Alka-PlexLiquid™ (experimental condition) as compared to a filtered bottled water (placebo condition).

Methods

Ten male cyclists (Mean ± SD: 40 ± 5 years age, 51.3 ± 7.8 ml/kg/min maximal oxygen uptake) performed two trials (1-week apart) of stationary cycling in a warm room (27.5–28.5°C, ≥50% relative humidity) for 75–105 minutes at a power output that initially elicited 70–80% of maximal heart rate. Subjects exercised until dehydrating to -2.5% of pre-exercise nude body weight. Each cycling bout was followed immediately by the consumption of either the experimental (Akali; Glacier Water Company, LLC; Auburn, WA USA) or placebo (Aquafina; PepsiCo Inc., Purchase, NY USA) bottled waters (counterbalanced order, double-blind design) in a volume equivalent to body weight lost. Blood and urine samples, as well as nude body weight, were measured at fixed time points: Immediately pre- and post-exercise, and 30, 60, 90, 120, and 180 minutes post-exercise. Urine samples were analyzed for volume output and specific gravity, while changes in total serum protein were determined from the blood samples. Data were evaluated with paired t-tests and repeated measures ANOVA with planned contrasts at the 0.05 alpha level.

Results

Neither absolute (Mean ± SE; -2.00 ± 0.05 and -1.95 ± 0.07 kg) nor relative (-2.6 ± 0.1 and -2.5 ± 0.1%) amounts of body mass lost differed between placebo and experimental dehydration ($P > 0.05$), respectively. Urine output was significantly higher at time points ≥60 minutes post ingestion: 103.5 ± 24.4 versus 58.4 ± 14.0 mls, 183.1 ± 33.1 versus 125.2 ± 33.4 mls, 198.7 ± 35.9 versus 97.7 ± 25.5 mls, 234.5 ± 53.0 versus 107.6 ± 21.6 mls, for 60, 90, 120, and 180-min post ingestion, respectively ($P < 0.05$). At the same time points, urine specific gravity tended to be higher for the experimental (1.014–1.012) than placebo water (1.005–1.008;$P = 0.02–0.08$). Lastly, serum protein tended to be less concentrated in the blood for the experimental water trial than for the placebo water trial at 120-minutes (7.7 ± 0.03 versus 6.7 ± 0.2 g/L; $P = 0.08$) and 180-minutes (7.8 ± 0.3 versus 6.7 ± 0.2 g/L; $P = 0.08$) post ingestion. Water retention at the end of the 3-hour recovery period, calculated as 1 minus the ratio of total urine volume (TUV) to ingested water volume (IWV) as a percentage ([1-(TUV/IWV)] × 100)), was significantly higher for the experimental water trial (79.2 ± 3.9%) than for the placebo water trial (62.5 ± 5.4%; $P < 0.05$).

Conclusion

Consumption of the experimental water resulted in significantly less urine output, a tendency for more water to be

retained in the blood, and a higher overall water retention rate over the placebo water. Collectively, these results indicate that consumption of the experimental bottled water following a dehydrating bout of exercise provided faster and more complete rehydration to cyclists than the highly-filtered bottled water. It is likely that the Alka-Plex-Liquid™ supplement, the high pH of 10.0, or some other unidentified component of the experimental water, was responsible for these observations.

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