Beverage Hydration Index comparison of enterade®, oral rehydration solution, and sports drink

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Abstract

Background

Beverage retention is affected by many factors (e.g., osmolality, electrolytes, etc.). The “Beverage Hydration Index” (BHI) was created to assess the degree to which beverages “hydrate”, by measuring fluid retention after ingesting a liter bolus and comparing it to water. Drinks with carbohydrates and electrolytes score higher on the BHI due to glucose-sodium cotransport at the gut and osmolality approaching isotonicity with blood. Recently, a hypotonic rehydration beverage (enterade®) was developed to take advantage of amino acid-sodium cotransport, thus obviating the need for carbohydrates. The purpose of this investigation was to assess BHI of enterade® in comparison to a carbohydrate-containing sport drink and an oral rehydration solution (ORS).

Methods

In a repeated-measures design, forty study participants (males, n=17; females, n=23), age (mean±SD): males 19.7±0.7, females 20.3±0.9, BMI: males 23.7±2.8; females 22.4±2.7, were studied in a eucaloric state (first morning void USG <1.025) after an overnight fast. They emptied their bladders, recorded their body mass and then ingested 1 L of fluid over 30 minutes (4 x 250 mL boluses every 7.5 minutes). The beverages, with corresponding osmolalities and kcal content, were as follows: distilled water (~0 mmol/kg; kcal/L), enterade® (195 mmol/kg; 21 kcal/L), ORS (270 mmol/kg; 105 kcal/L) and a sports drink (330 mmol/kg; 237 kcal/L). Each trial was separated by ~1 week. Urine output was collected and measured immediately, and each hour following the first collection for 2 hours, following fluid ingestion. Individual hour cumulative urine mass and BHI were measured immediately, and each hour following the first collection for 2 hours, following fluid ingestion. The beverages, with corresponding osmolalities and kcal content, were as follows: distilled water (~0 mmol/kg; kcal/L), enterade® (195 mmol/kg; 21 kcal/L), ORS (270 mmol/kg; 105 kcal/L) and a sports drink (330 mmol/kg; 237 kcal/L). Results

Mean (±SD) total urine mass losses over 2 hours for enterade® (1013±288 g) and the ORS (959±234 g) were significantly less than water (1118±242 g; P<0.05) while the sports drink (1075±293 g; P=0.05) was not. The calculated BHI of enterade® (1.13±0.28) and the ORS (1.21±0.28) were greater than water (1.0±0.0; P=0.05) while the sports drink (1.0±0.26; P=0.05) was not.

Conclusions

Based upon these data, enterade® and a traditional ORS are superior to water to optimize rehydration, while sports drink was not. Importantly, the high BHI for enterade® was achieved without carbohydrate, making it a low-calorie alternative for effective rehydration.

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Introduction

Recently, investigators created a metric called the “beverage hydration index” (BHI) to reflect the hydrating potential of commonly consumed fluids (1). The BHI data demonstrated that many beverages have a higher hydrating potential (i.e., more fluid is retained after ingestion) compared to water. The present results support the original investigation demonstrating that electrolyte and macronutrient composition plays a major role in fluid retention and thereby the BHI value (1).

Results

 summary

This investigation demonstrates that enterade® and a commercially available ORS hydrate better than water.

 Importantly, enterade® causes fluid retention without using sugar

 enterade® may be advantageous as a rehydration beverage for various populations (both clinical and athletic) that seek to minimize their consumption of sugar while optimizing their hydration.

REFERENCES