FAST REHYDRATION RATE HELPS TO KEEP POSITIVE BODY FLUID BALANCE LONGER TIME: A PILOT STUDY

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ABSTRACT:

PURPOSE: To compare the effects of three different post exercise rehydration rates after exercise derived dehydration on body fluid balance and subjective feelings of thirstiness and bloating.

METHODS: We evaluated five male college soccer players. They were weighted before performing a treadmill run to induce a ≈2% body weight loss by sweating. After the dehydration, subjects were rehydrated with 150% of their body weight loss with a carbohydrate electrolyte solution (5% CHO, 30 Na mEq/L). Subjects were assigned to one of three postexercise rehydration rates in a randomized, counterbalanced and crossover design. The postexercise rehydration rates consisted on drinking the whole fluid volume the first 30 minutes in 3 equal doses (H30), or the first 60 minutes in 5 equal doses (H60), or the first 120 minutes in 9 equal doses (H120) after dehydration. Subjects were weighted without clothes (after voiding their bladders and drying the skin with towels) each 30 minutes during a 240 minutes lapse. At the same time they answered a visual analogue scale to answer how thirsty and how bloated they felt at that moment. Results are presented as mean. A two-way repeated measures ANOVA was performed.

RESULTS: Positive fluid balance in H30 was significantly higher than H60 and H120 at minute 30. H30 and H60 were higher than H120 at minute 60. H60 was higher than H120 at minute 90, but H30 was not different vs H60 nor H120. H30 kept a positive fluid balance for 2 hours, H60 for 1 hour, and H120 for 0.5 hours. Thirstiness was significantly lower in H30 than H120, but not to H60 at minute 30, no other difference was found. Bloating was significantly higher in H30 than H120, but not to H60 at minute 30, no other significant difference was found (Table 1).

CONCLUSIONS: The H30 rehydration rate was effective to keep positive fluid balance for a longer period and to rapidly achieve positive fluid balance and decrease thirstiness acutely, however bloating may be a concern employing this rehydration rate.

INTRODUCTION

Current guidelines for post-exercise rehydration suggest subjects should drink 125 to 150% of their weight loss to ensure adequate fluid replacement (1,2). This surplus may overcome the fluid loss for urine production during and sweating after exercise. However, little is known about the rate in which it should be drank (2). Some research suggest that drinking a large volume in a short period may lead to blood dilution and to diuresis, resulting in a negative fluid balance. Therefore, consuming these volumes in a longer period would circumvent blood dilution, diuresis, and lead to a neutral or positive fluid balance (3-5). However, athletes usually prefer drinking large volumes in a short period to assuage thirstiness, which also may lead to bloating. Therefore, the purpose of this study was to compare the effects of three different post exercise rehydration rates after exercise-derived dehydration on body fluid balance and subjective feelings of thirstiness and bloating.

METHODS

Subjects

We evaluated five male college soccer players from the representative team of the University of Guadalajara. They were informed orally about the objectives, procedures and possible risks about this protocol, and we obtained a written statement of consent before any test were performed.

Pre testing

Subjects were instructed to refrain from exercise, and drinking alcohol, coffee and energy drinks for at least 24 h before they arrived the laboratory. Also were instructed to drink 5 ml of plain water/kg two hours before testing. Subjects voided their bladders and defecated before the assessments started.

Dehydration protocol

First, subjects were weighted without clothes, this was stated as the euhydrated weight. Then, they ran on a treadmill for 45 minutes until they reached a 2% weight loss. If they didn't, they ran again for 20 minutes until they reached the weight goal or until volitional exhaustion.

Rehydration rate

After the dehydration protocol, they received the 150% of their weight loss with a flavored carbohydrate-electrolyte solution (5% glucose, 30 mEq Na/L). They were assigned in a randomized, crossover and counterbalanced design into one of three post-exercise rehydration rates. Fast rate: Consisted on drinking the whole volume the first 30 minutes, in three equal doses 15 minutes apart. Moderate rate: Drinking the whole volume the first 60 minutes, in five equal doses, 15 minutes apart. Slow rate: Drinking the whole volume the first 120 minutes, in nine equal doses, 15 minutes apart.

Body fluid balance, thirstiness and bloating

Subjects were evaluated immediately after the dehydration protocol and every 30 minutes for a 240-minute lapse after exercise. This assessments consisted on measuring body weight without clothes (only after voiding their bladders and drying the skin with towels), and answering a visual analogue scale about their feelings of thirstiness and bloating. This consisted on a 100 mm straight line asking "How thirsty/ bloated do you feel right now?", where 0 mean "not at all" and 100 "completely".

We calculated the body fluid balance (BFB) accordingly to the next equation:

$$BFB\ (\%) = (PEW — EW)/\ EW * 100$$

Where PEW is the post-exercise weight at every evaluation time, and EW is the euhydrated weight.

Statistical analysis

We compared the BFB, thirstiness and bloating scores with a two way repeated measures ANOVA, with a Tukey post hoc test. All analysis were considered significant with a p value ≤0.05.

RESULTS

BFB was similar at 0 time between rates. The Fast rate rapidly achieved a positive BFB at minute 30 and was significantly higher than Moderate and Slow rates (Figure 1). Moderate rate was positive since minute 60, it was similar to Fast rate, and both were significantly higher than Slow rate. At minute 90, Slow rate reached a positive BFB, and there were significant differences between Moderate and Slow rates (Figure 1). There were no significant differences for BFB between rates at any other moment. The Fast rate kept a positive BFB for two hours, the Moderate rate for one hour, and the Slow rate for a half hour (Figure 1).

Bloating feelings were significantly higher for Fast rate than Slow but not Moderate rate at minute 30 (Figure 2A). Thirstiness was significantly lower for Fast rate than Slow but not Moderate rate at the same time (Figure 2B). No other significant difference was observed at any other moment neither for bloating or thirstiness.

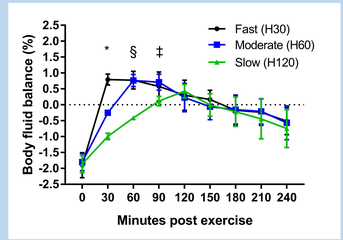

Figure 1. Body fluid balance after a dehydration protocol and receiving a fast, moderate or slow post-exercise rehydration rate. Significant differences (p<0.05) for:* Fast vs Moderate vs Slow; § Fast and Moderate vs Slow; ‡ Moderate vs Slow.

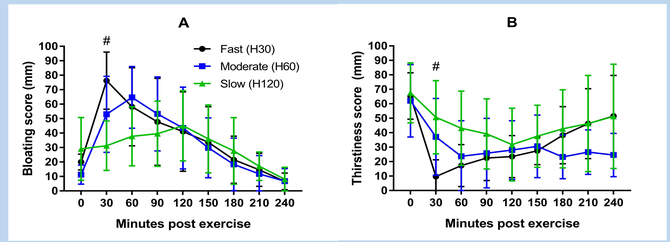

Figure 2. Subjective feelings about bloating (A) and thirstiness (B) after a dehydration protocol and receiving a fast, moderate or slow post-exercise rehydration rate. Significant differences (p<0.05) for: # Fast vs Slow.

CONCLUSIONS

Drinking a large volume of a flavored carbohydrate-electrolyte solution at a fast rate may be helpful for quickly achieve a positive BFB, keep it longer, and rapidly assuage thirstiness. However, bloating may be a concern employing this rate. If these results may affect exercise performance, warrants further research.

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