Effects of protein (PRO) inclusion in carbohydrate (CHO) drinks when consumed 50 minutes prior to a cycle to exhaustion

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Introduction

Over the last decade, researchers have suggested that endurance performance can be further enhanced by consuming a carbohydrate and protein (CHO-PRO) supplement when compared to a carbohydrate only supplement (CHO) (Ivy, Res, Sprague & Widzer, 2003; Saunders, Kane & Todd, 2004). However, the practical implications of these studies are held back by a number of methodological issues (Van Essen & Gibala, 2006).

Aims

The purpose of this study was to determine whether the inclusion of protein into a carbohydrate drink would improve endurance performance, when compared to a carbohydrate drink and a nonenergtic sweetened placebo (PL) in a cycle to exhaustion at 70% $VO_{2\ max}$.

Method

Seven male university students (age: 21 ± 1years, height: 174.1 ± 3.4cm, mass: 71.9 ± 3.5kg, $VO_{2\ max}$: 44 ± 10 $ml{\cdot}kg^{-1}{\cdot}min^{-1}$) performed a cycle to exhaustion on three occasions separated by 7days. In a double-blinded, placebo controlled, repeated measures crossover study, participants ingested CHO-PRO, CHO, PL at a rate of 500ml, 50 min before and 500ml during exercise. Both CHO and CHO-PRO beverages were matched for total calories (148kcal). Carbohydrate content was 34.7g & 35.3g for the CHO-PRO and CHO respectively. The CHO-PRO beverages contained an addition of 3.9g of protein. Data analysed included distance travelled, time to exhaustion, blood glucose and blood lactate concentration. Statistical analyses include a one way repeated measures ANOVA with a pairwise comparison.

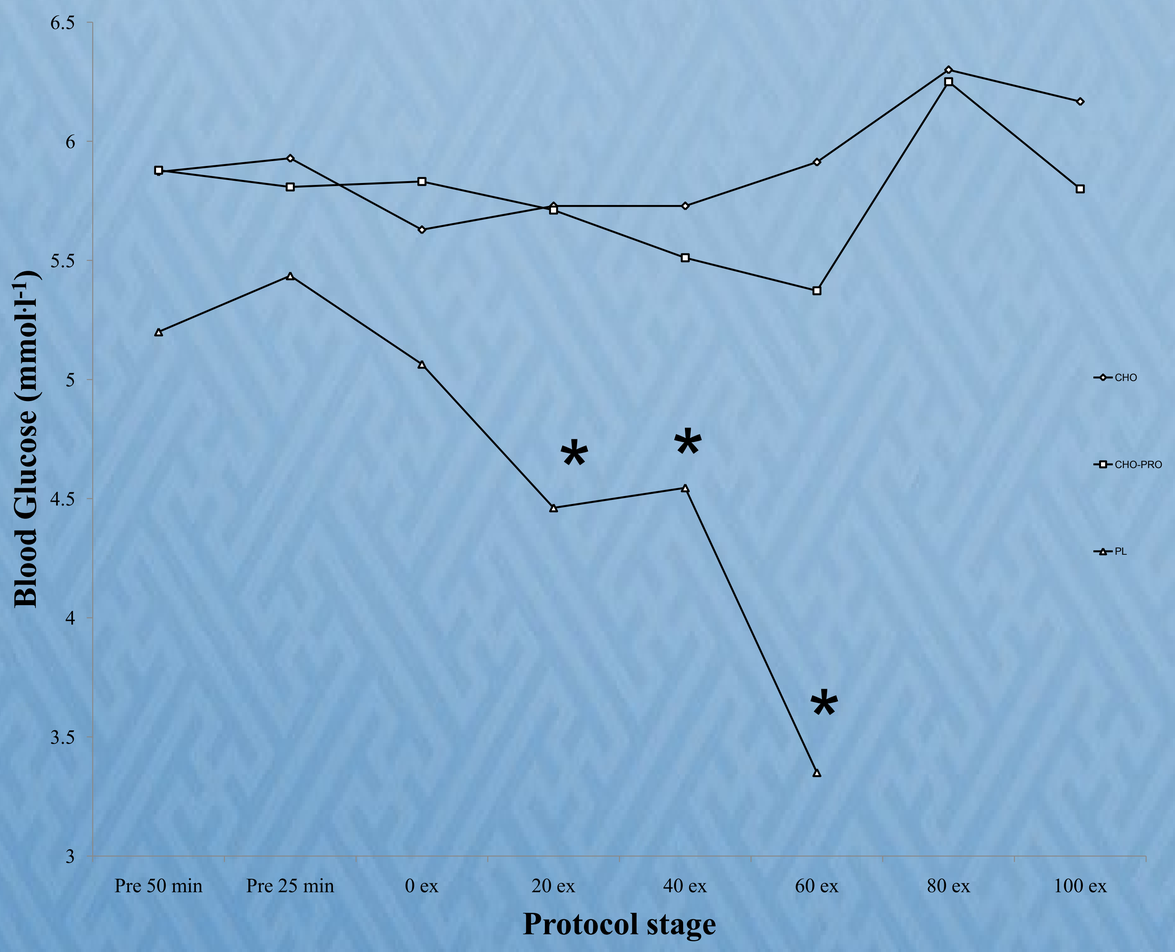

Figure 5. Blood glucose levels before and during exercise. Group means are presented at each time point. * $P < 0.05$ between supplemented drinks and PL.

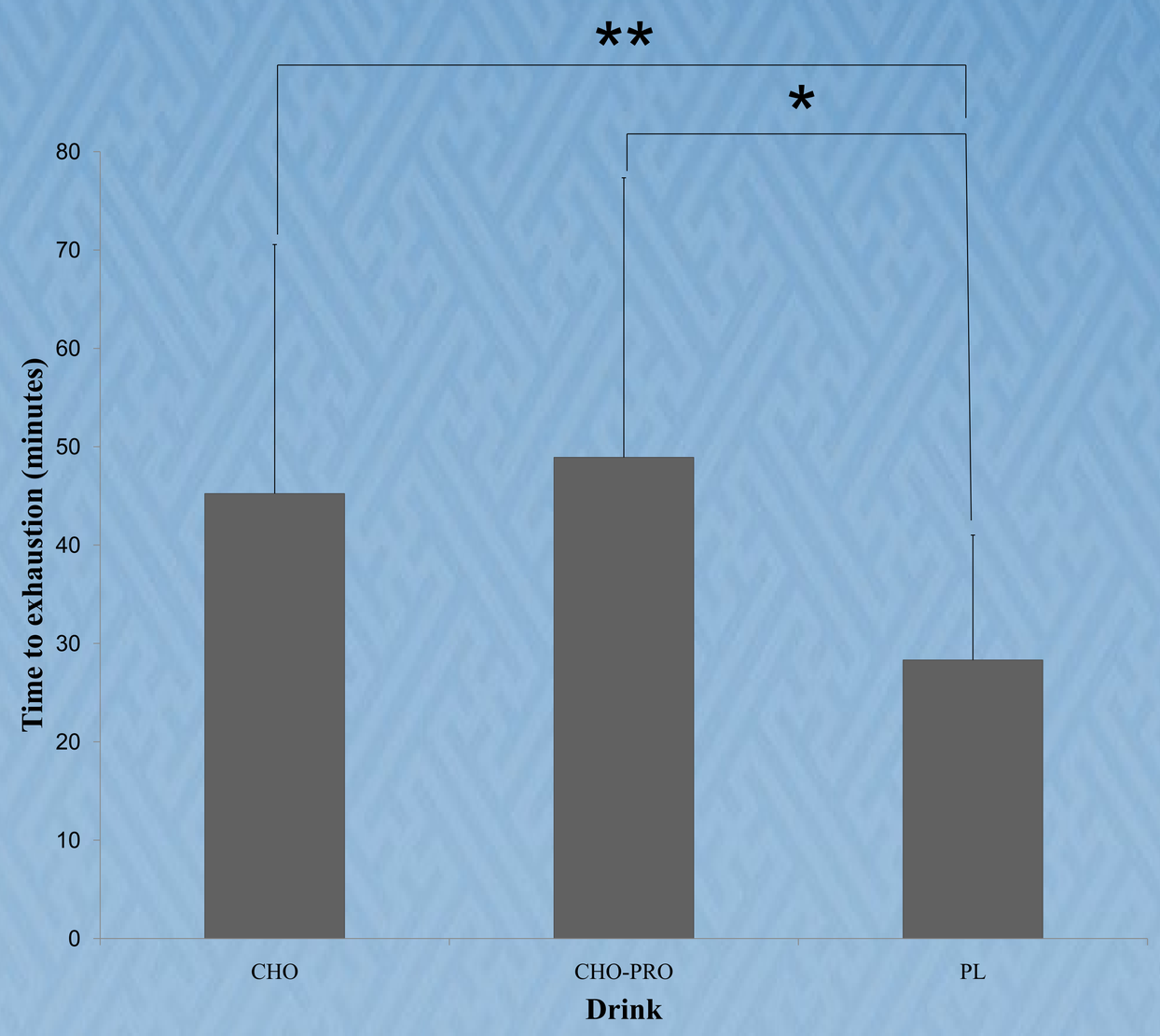

Figure 2. Mean (± SD) time to exhaustion at 70% $VO_{2\ max}$ for participants that consumed a PL, CHO and CHO-PRO drink before and during exercise. * $P = 0.04$ between PRO and PL; ** $P = 0.05$ between CHO and PL.

Results

As predicted for time to exhaustion, distance travelled and glucose levels, CHO and CHO-PRO significantly increased results when compared to the PL condition ($P < 0.05$). However no significant difference was observed between CHO and CHO-PRO in time to exhaustion (45.23 ± 25.32 min vs 48.92 ± 28. 42 min; $P = 0.39$) (Fig. 2), distance travelled (24.09 ± 13.43 km vs 24.88 ± 13.45 km; $P = 0.44$), average blood glucose (5.687 ± 0.28 $mmol{\cdot}l^{-1}$ vs 5.690 ± 0.37 $mmol{\cdot}l^{-1}$; $P = 1.000$) and glucose over time ($P = 0.95$) (Fig. 1). Variables such as lactate, heart rate and RPM were not significantly different ($P > 0.05$) between all three trials.

Discussion

Ingesting a CHO and CHO-PRO beverage 50 minutes before and during exercise will improve endurance performance when compared to a PL condition ($P < 0.05$), however a CHO-PRO beverage will not significantly further enhance performance when compared to a CHO only supplement ($P > 0.05$). Further research needs to be studied in this area, as there are clear conflicting conclusions amongst the literature.

Acknowledgements

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