TACSM Abstract

Appetite Alterations in Endurance Athletes Following the Ketogenic Diet

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ABSTRACT

Recently, endurance athletes have utilized a very low-carbohydrate diet, the ketogenic diet (KD), to improve performance in competition. The KD may be associated with diminished appetite, but this has not been explored in endurance athletes. **PURPOSE**: The purpose of this study was to evaluate the effects of a KD compared to a high-carbohydrate diet (HCD) and habitual diet (HD) on both subjective and objective measures of appetite in highly-trained cyclists and triathletes. **METHODS**: Following their HD, six highly-trained (≥80th percentile for $V0_{2max}$ based on age and sex) cyclists and triathletes (male = 2, female = 4; age: 37.2 ± 12.2) consumed a KD and HCD, for two weeks each, in a random order. At the end of each diet, perceptions of fasting hunger, desire to eat (DTE), prospective consumption of food (PCF) and fullness, and serum total ghrelin (GHR) and glucagon-like-peptide-1 (GLP-1) were assessed. Immediately after collection of the fasting measures, a test meal containing an energy content that was 60% of measured resting metabolic rate was administered. The test meal composition corresponded with the participants diets (ketogenic meal after the KD, high-carbohydrate meal after the HCD, and a standard American meal after their HD). After ingestion of the test meal, postprandial appetite measures were collected for 3 h at 30, 60, 120, and 180 min. **RESULTS**: Repeated measures analysis showed that fasting GHR was significantly lower following the KD than the HD (p=0.001) and HCD (p=0.031) and fasting GLP-1 was significantly higher following the KD than the HD (p=0.041) and HCD (p=0.033). Fasting hunger was also significantly higher following the KD compared with the HD (p=0.042) and HCD (p=0.004) and PCF was higher for the KD versus HD (p=0.020). There were no differences between diets for fasting DTE and fullness. Postprandial GHR was significantly lower following consumption of the ketogenic test meal than the standard meal (p=0.007) and high-carbohydrate meal (p=0.031). Peak concentrations of postprandial GHR and incremental area under the curve (iAUC) for GHR were also significantly lower following the ketogenic meal than the standard meal (p=0.025; p=0.016, respectively) and the high-carbohydrate meal (p=0.044; p=0.045, respectively). Postprandial GLP-1 was significantly higher following consumption of the ketogenic test meal than the standard meal (p=0.006) and high-carbohydrate meal (p=0.003). Peak concentrations of postprandial GLP-1 and GLP-1 iAUC were also significantly higher following the ketogenic meal than the standard meal (p=0.009; p=0.004, respectively) and the high-carbohydrate meal (p=0.008; p=0.002, respectively). There were no differences in postprandial ratings of appetite between diets. **CONCLUSIONS**: Both fasting and postprandial concentrations of GHR were lower and GLP-1 were higher following the KD than the HC and HD in endurance athletes. Subjective ratings of appetite did not correspond with the objective measures of appetite, however. More research is needed to confirm our findings, and to understand the relationship between subjective and objective measures of appetite in endurance athletes.