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Initial Metabolic State and Exercise-Induced Endotoxaemia Are Unrelated to Gastrointestinal Symptoms During Exercise

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ABSTRACT

The aim of the study was to investigate the association between the initial metabolic state and exercise-induced endotoxaemia on the appearance of gastrointestinal symptoms (GIS) during exercise. Eleven males (36.6 ± 4.9 yrs, 1.7 ± 0.1 m, 74.5 ± 7.7 kg, DEXA body fat % 17.2 ± 6.6, VO₂max 57.4 ± 7.4 ml·kg⁻¹·min⁻¹) underwent two isoenergetic diets designed to change their initial metabolic status by either depleting or maintaining their hepatic and muscular glycogen content. These diets and accompanying exercise sessions were performed by each participant in the days before completing a laboratory-based duathlon (5-km run, 30-km cycling, 10-km run). Blood samples were obtained before, immediately and 1- and 2-h following the duathlon for determination of insulin (IN), glucagon (GL), endotoxin, aspartic aminotransferase (AST), and alanine aminotransferase (ALT) markers. GIS were assessed by survey before and after exercise. Diet content produced a different energy status as determined by macronutrient content and the IN/GL ratio (p < 0.05), and mild exercise-induced endotoxaemia was observed in both experimental duathlons. Regardless of the diet, the AST/ALT ratio following exercise and in the recovery phase indicated hepatocyte and liver parenchyma structural damage. In spite of GIS, no significant correlations between endotoxin levels and GIS were found. In conclusion, increased markers of endotoxaemia observed with the high-intensity exercise were unrelated to hepatic function and/or GIS before and after exercise.

Key words: Liver structure, endurance, lipopolysaccharide, endotoxaemia, exercise

Key Points

- Gastrointestinal symptoms before, during, and after a competition are reported by approximately 20%-50% of the athletes participating in endurance events such as marathon, cycling and triathlon.

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