

Abstract

# Acute Effect of Aerobic Exercise Performed at Different Times of Day on Glucose Levels in Patients with Type 2 Diabetes <sup>†</sup>

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**Abstract:** **AIM:** There is some evidence to suggest that exercise in the evening, compared with exercise in the morning, has a more beneficial impact on glycemia in patients with type 2 diabetes (T2D). The aim of this study was to examine a possible acute effect of aerobic exercise performed at different times of day on blood glucose levels during and after exercise in patients with T2D. **MATERIAL & METHOD:** Eight male T2D patients ( $61.8 \pm 6.9$  yrs,  $27.7 \pm 3.1$  kg/m<sup>2</sup>, HbA1c:  $6.5 \pm 1.1\%$ ; mean  $\pm$  SD), who did not receive insulin, performed 60-min cycling at about 75% maximal heart rate (HR<sub>max</sub>) either at 10:30 (Morning-M), or at 17:30 (Evening-E), or 30-min cycling at 10:30 and 30-min cycling at 17:30 (ME). A control condition (C) was also included where volunteers did not exercise but had their blood glucose measured at day-time intervals similar to the time intervals of the three exercise trials. Two days before each condition no physical activity was allowed, while the day before and on the day of each trial participants controlled their diet. **RESULTS:** Compared to resting levels, blood glucose at the end of exercise decreased at similar levels in M ( $20 \pm 12\%$ ), E ( $28 \pm 14\%$ ), in the morning of ME ( $21 \pm 10\%$ ) and in the evening of ME ( $26 \pm 19\%$ ) ( $p > 0.05$ ). Also, heart rate, blood lactate and rate of perceived exertion responses during exercise were similar between the 3 exercise conditions. Mean area under the blood glucose-time curve over the two-hour post-exercise period in exercise trials, and at similar time intervals in C, was different only between the morning in C ( $15,173 \pm 1830$  mg/dL·120 min) and the evening in ME ( $11,681 \pm 1526$  mg/dL·120 min,  $p = 0.045$ ). In addition, overnight fasting serum glucose the morning after each trial was similar between conditions ( $p > 0.05$ ). **CONCLUSIONS:** No acute effect of cycling at about 75% HR<sub>max</sub> was observed on glycemia in patients with T2D when exercise was performed at different times of day.

**Keywords:** aerobic exercise; diabetes; glucose



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