

Poster presentation

Does prior exercise affect oral glucose tolerance test results?

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from 2008 International Society of Sports Nutrition Conference and Expo
Las Vegas, NV, USA. 9–10 June 2008

Published: 17 September 2008

Journal of the International Society of Sports Nutrition 2008, **5**(Suppl 1):P14 doi:10.1186/1550-2783-5-S1-P14

This abstract is available from: <http://www.jissn.com/content/5/S1/P14>

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Background

When oral glucose tolerance tests (OGTT) are repeated in individuals, relatively large variations in the magnitude of the blood glucose response often occur from one measurement occasion to another. Little is known about what causes this within-subject variability. One potential contributor may be the subject's prior extent of physical activity and/or the amount of stored glycogen present at the time of the OGTT. This research tested the effect of a bout of exercise (of the type known to significantly deplete muscle glycogen) performed within 24 hours prior to an OGTT on blood glucose and insulin responses.

Methods

Ten male endurance athletes underwent an OGTT without prior exercise on one occasion (no-Ex) and after a glycogen-depleting bout of exercise the day prior to testing on another occasion (post-Ex). Venous blood was sampled at standard intervals (0, 15, 30, 45, 60, 90, and 120 minutes) following consumption of an OGTT beverage containing 50 grams of glucose. Capillary blood samples also were taken at the same intervals by finger stick to simulate the standard protocol used for glycemic index (GI) measurement. Venous and capillary blood samples were analyzed for glucose. Venous samples also were analyzed for serum insulin concentration. Glucose and insulin areas under the curve (AUC) were calculated.

Results

Within each group, mean glucose AUC measured in capillary blood did not differ from that measured in venous blood. Also, there was no significant difference in capillary glucose AUC between the no-Ex and post-Ex conditions (mean \pm SD: 3364 \pm 1557 and 4318 \pm 1701 mg \cdot min/dL, respectively; $P = 0.10$). However, insulin AUC values were significantly lower on post-Ex days ($P = 0.03$). When insulin levels were held constant (statistically), the mean glucose AUC levels were significantly greater the day after exercise ($P = 0.03$). The range of glycemic response among these athletes was substantial, with 2-hour capillary glucose AUC ranging from 845 to 5010 and 1348 to 6480 mg \cdot min/dL in the no-Ex and post-Ex conditions, respectively.

Conclusion

Based on this evaluation of ten male endurance athletes, performing a glycogen-depleting type of endurance exercise bout the day before an OGTT results in a blunted insulin response and a tendency toward a greater glycemic response. Ideally, the extent of exercise performed the day before an OGTT should be held constant when repeated glycemic response measurements are taken for purposes such as GI testing.

Acknowledgements

The authors especially thank the study participants and Clinical Research Center staff. This study was supported by a Research Centers in Minority Institutions Award, P20 RR011091, NCCR/NIH. These results and evalua-

tion are solely the responsibility of the authors and do not necessarily represent the official views of the NCR/NIH.

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