Effects of high carbohydrate or high protein energy-restricted diets combined with resistance-exercise on weight loss and markers of health in women with serum triglyceride levels above or below median values

Jonathan M Oliver1*, Julie Y Kresta1, Mike Byrd1, Claire Canon1, Michelle Mardock1, Sunday Simbo1, Peter Jung1, Britannie Lockard1, Deepesh Khanna1, Majid Koozehchian1, Chris Rasmussen1, Chad Kerksick2, Richard Kreider1

From International Society of Sports Nutrition; 7th Annual ISSN Conference and Expo Clearwater Beach, FL, USA. 24-26 June 2010

Background
A diet high in protein has been shown to have beneficial effects on weight loss and triglyceride (TG) levels when combined with exercise. Recent research has also shown that a diet high in protein in the absence of exercise promotes more favorable results for individuals above the median TG (mTG) levels (>133 mg/dL). The purpose of this study was to determine if women with TG above median values experience greater benefits to a diet and circuit resistance-training program.

Methods
442 apparently healthy sedentary obese women (48±12 yrs, 64±3 in, 201±39 lbs, 45±5 % fat) completed a 10-wk exercise and diet program. All subjects participated in Curves circuit training (30-minute hydraulic resistance exercise interspersed with recovery floor calisthenics performed at 30-seconed intervals 3 days/wk) and weight loss program (1,200 kcal/d for 1 wk; 1,600 kcal/d for 9 wks). Subjects were randomly assigned to a high protein or high carbohydrate isocaloric diet. The high protein (HP) group (n=200) consumed 30% fat, 55-63% protein, and 9-15% carbohydrate diet while the high carbohydrate (HC) group (n=242) consumed 30% fat, 55% carbohydrate, and 15% protein diet. Pre and post measurements included standard anthropometric measurements including dual energy X-ray absorptiometry (DEXA), as well as resting energy expenditure (REE), metabolic blood analysis, and blood pressure. Subjects were stratified into a lower or higher TG group based on the mTG value observed (125 mg/dL). Data were analyzed by MANOVA with repeated measures and are presented as means ± SD percent changes from baseline.

Results
Fasting serum TG levels differed between groups stratified based on mTG levels (<mTG 86±24 vs >mTG 204 ±84 mg/dL, p=0.001). Time effects were observed in all anthropometric measurements including waist and hip, as well as weight loss, fat mass and percent body fat. Subjects on the HP diet experienced greater reductions in weight than those on the HC diet (HP -3.1±3.4%; HC -2.3±2.5%, p=0.005) and fat mass (HP -1.7±3.1%; HC -1.3±2.0%, p=0.006). No differences were seen in any measures in subjects with > mTG. However, a Time x Diet x mTG interaction was observed in changes in hip circumference. Subjects in the HP diet with <mTG experienced a greater reduction in hip circumference (-2.7 ± 4.8%) than those with >mTG levels (-1.9 ± 3.4%, p=0.029). Time effects were also observed in systolic and diastolic blood pressures, REE, cholesterol, high density lipoprotein cholesterol, and triglycerides. No significant differences were observed in resting metabolic rate, energy expenditure, or fat mass. No differences were observed in any measures in subjects with > mTG.
lipoprotein (HDL), low density lipoprotein (LDL) and uric acid. While no time effects were observed with changes in TG, subjects on the HP diet experienced a significantly greater reduction (p=0.048) in TG levels (-5.6 ± 34.0%) than those on the HC (2.0 ± 36.5%) while subjects with >mTG, also experienced a greater reduction (p=0.02) in TG levels (-12.3 ± 29.8%) than those with <mTG (9.1 ± 39.4%).

Conclusion

Results reveal that diet combined with circuit training promotes decreases in waist and hip circumference, weight loss, fat mass and body fat percentage while concomitantly reducing blood pressure, cholesterol and uric acid, and increasing resting energy expenditure. A HP diet promotes greater reductions in weight loss, fat mass and TG levels. Greater reductions in TG levels were experienced by individuals with mTG levels > 125 mg/dL. While a HP diet promotes greater reductions in TG, individuals with TG levels > 125 mg/dL experience greater reductions regardless of diet.

Acknowledgement

We would like to thank Jean Jitomir, Monica Serra, Jen Moreillon, Erika Deike, Geoffrey Hudson, and Mike Greenwood who assisted in data collection on the first cohort of subjects that participated in this study when the ESNL was located at Baylor University. This study was supported by Curves International, Waco, TX.

Author details

1Exercise and Sports Nutrition Laboratory, Texas A & M University, College Station, TX, USA. 2Applied Biochemistry and Molecular Physiology Laboratory, University of Oklahoma, Norman, OK, USA.

Published: 15 September 2010

doi:10.1186/1550-2783-7-S1-P9
Cite this article as: Oliver et al.: Effects of high carbohydrate or high protein energy-restricted diets combined with resistance-exercise on weight loss and markers of health in women with serum triglyceride levels above or below median values. Journal of the International Society of Sports Nutrition 2010 7(Suppl 1):P9.