Morphologic and systemic alterations in obese and overweight subjects after a physical activity intervention program

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1. Introduction

The prevalence of obesity is increasing in the developed societies [1]. Overweight and weight gain are major risk factors for type 2 diabetes [2], cardiovascular diseases [2, 3] and even certain forms of cancer [4].

Weight loss improves insulin sensitivity, glycemic control [5] and may be associated with reduced mortality [6]. For every kilogram of weight loss, there are a 10% reduction in risk of type 2 diabetes [7].

2. Material and Methods

Subjects

Sixteen obese and overweight (mean BMI 31.4 ± 5.7 Kg/m²) type 2 diabetic patients, 7 males and 9 females, (mean age 64.5 ± 7.2 years; mean height 159 ± 9.2 cm; mean body mass 79.8 ± 16.7 kg), performed the present study. In the moment of the study, all subjects had oral anti-diabetic and no insulin, and they had not diabetic complications. The medication was not altered during the time of the present study.

Experimental protocol

The subjects perform a regular physical activity intervention program, named “Mexa-se em Bragança”, which consists on sessions of 50 minutes each, every day (5 days), during 8 months, and no diet intervention.

Each session has as minimum 35 minutes of fast walking (±6 Km/h) and 15 minutes of some light strength and stretching exercises.

On Wednesdays it was performed water aerobics sessions (middle of the week), in order to alleviate stress induced to inferior members joints of the subjects.

Adherence to the physical activity program was reinforced and monitored daily by the exercise staff.

Morphologic Data

Height was measured twice to the nearest 0.1 cm using a wall mounted digital stadiometer (Seca, model 242, Hamburg, Germany). Weight was measured twice to the nearest 0.1 kg on an electronic scale (Seca 884, Hamburg, Germany). In both weight and height the average of the two measures was used.

Blood pressure was analyzed through an electronic sphygmomanometer (model OMROM 705IT).

Waist was measured twice to the nearest 0.1 cm using a conventional tape measure.

Systemic Data

It was collected 5 ml of venous blood from antecubital vein on the left arm, with BRAUN sterilized squirt.

Total cholesterol, LDL, HDL and TG, where analyzed by an autoanalyzer of clinical chemistry through calorimetric method (photometric enzymatic test – Mira Plus model, ABX).

Insulin was analyzed in serum by chemiluminescence method.

In total cholesterol, LDL, HDL, TG and insulin the changes were analyzed in an 4 months period and in weight, BMI, waist and blood pressure were analyzed in an 8 months period.

3. Results and Discussion

3.1. Morphologic alterations during the physical activity program

All the morphologic parameters analyzed revealed significant decreases, namely in weight $F(1, 15) = 6.688$; $p=0.021$, BMI $F(1, 15) = 7.396$; $p=0.016$ and waist $F(1, 15) = 43.032$; $p=0.000$ – table 1 and figure 1 (A, B and C).

3.2. Systemic alterations during the physical activity program

In systemic alterations it was observed only an significant reduction in LDL concentrations $F(1, 7) = 14.264; p=0.007$ – table 2 and figure 2 (I).

These results are consistent with other studies, where only with physical activity programs was possible to improve LDL concentrations [9].

Despite the best improves are seen as a result of combine strategies (diet and exercise interventions), namely including very low-caloric diets or low-caloric diets [10], the present study shows that with a long-term physical activity program only, it’s possible to achieve significant changes in some health parameters.

4. Conclusions

The participation in the physical activity program described above enables the subjects to improve their morphologic and systemic parameters without alterations in their diet.

Namely, an reduction on weight, BMI, waist and LDL.

5. Bibliography