EFICACY, SAFETY AND METABOLIC EFFECTS OF CARBOHYDRATE RESTRICTION IN THE TREATMENT OF OBESE ADOLESCENTS

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Introduction:
• Available experience regarding the modification in the proportions of macronutrients for the treatment of obesity in adolescents is limited.
• Dietary carbohydrate restriction could cause a substantial shift in the substrates preferentially used as energy source, thus inducing modifications on body composition and, together, expected to determine metabolic changes in obese adolescents.

Objectives:
To evaluate the effect of dietary carbohydrate restriction for 6 months in obese adolescents on:
1) Body composition
2) Parameters of carbohydrate metabolism
3) Lipid profile

Patients and methods:
• Out of a group of 110 obese Caucasian adolescents recruited and visited monthly, thirty-six completing a minimum follow-up of 6 months were studied. This subgroup was made up of 22 girls and 14 boys and their mean age and BMI were 15.8 ± 1.5 years and +4.72 ± 2.80 BMI-SDS, respectively.
• Patients were randomly assigned to two different nutritional interventions, both affording similar caloric supply (1500 kcal/day) but differing in the relative proportion of macronutrients: limited carbohydrate diet (L-CH; n=19, 10% daily energy supply from carbohydrates, 60% from fat and 30% from proteins for 4 months and, after the fourth month, 30% from carbohydrates, 50% from fat and 20% from proteins) vs. unrestricted (normal) carbohydrate diet (N-CH, n=17, 52% daily energy supply from carbohydrates, 30% from fat and 18% from protein, during the 6 month period).
• Patients were studied at recruitment (R) and after 3 (3M) and 6 months (6M). BMI, body composition (as measured by bioimpedance analysis [BIA], Tanita® BC-420MA), glycemia, insulinemia, HOMA index, lipid profile, uric acid and serum 25(OH) vitamin-D levels were analyzed in every time-point.

Results:
• Both groups significantly reduced their BMI-SDS from R to 6M (p < 0.001), although this reduction in BMI was more intense in the L-CH group (−1.70 ± 0.98 vs. −0.80 ± 1.09 BMI-SDS in the N-CH; p < 0.05). This decrease in BMI was mainly achieved in the first 3 months of dieting (−1.41 ± 0.71 vs. −0.62 ± 0.78 in the N-CH; p < 0.001) as the BMI-SDS evolution between 3 and 6 months was similar. This loss in BMI was due to a decrease in fat mass (Figures A & B).
• A transient rise in serum uric acid levels was observed in the L-CH group at 3M (p < 0.01), which normalized at 6M (Fig. C).
• HOMA index improved significantly exclusively in the L-CH group at 6M (−1.75 ± 1.48 vs. +0.15 ± 1.25 in N-CH; p < 0.001), despite both groups achieved significant weight reduction (Figure D).
• In contrast, both groups showed a similar increase in serum 25(OH) vitamin-D levels after attaining weight loss at 6M (p < 0.001, Figure E).
• No significant differences within or between groups were observed in the evolution of the components of the lipid profile studied.

Conclusion:
• Diet carbohydrate restriction results in a more intense weight reduction and insulin resistance improvement in obese adolescents after 6 months of treatment.

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