Negative correlation between neuropeptide Y/agouti-related protein concentration and adiponectinemia in nonalcoholic fatty liver disease obese adolescents submitted to a long-term interdisciplinary therapy

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Abstract

The complexity pathogenesis in the nonalcoholic fatty liver disease (NAFLD) involves an interplay between adipokines and neuroendocrine regulation of energy balance, including the role of neuropeptide Y (NPY)/agouti-related protein (AgRP) system. The first aim of this study was to assess the effect of long-term interdisciplinary intervention on NAFLD in obese adolescents, and the second objective was to establish the relationship between NPY/AgRP ratio and adiponectinemia. Fifty-five postpuberty obese adolescents were submitted to interdisciplinary intervention. The group was divided between subjects with and without NAFLD (n = 19 and 36, respectively). Blood samples were collected to measure glycemia, hepatic transaminases, lipid profile, insulin resistance, and sensitivity. Adiponectin, NPY, and AgRP concentrations were measured by enzyme-linked immunosorbent assay. Food intake was measured using 3-day diet records. It was observed at baseline that important clinical parameters including body weight, body mass index, visceral fat, homeostasis model assessment of insulin resistance, quantitative insulin sensitivity check index, triglycerides, very low-density lipoprotein cholesterol, and hepatic transaminases were more altered in NAFLD patients. After the intervention, these parameters, total energy, and macronutrient intake were reduced significantly in both groups. The most important finding was the positive correlation between AgRP and visceral fat in all patients and the negative correlation between NPY/AgRP and adiponectinemia only in NAFLD obese adolescents. NAFLD patients presented more altered clinical parameters than the non-NAFLD subjects, including the negative correlation between adiponectinemia and NPY/AgRP. These results suggested that NAFLD obese adolescents presented an inflammatory profile that can influence the neuroendocrine regulation of energy balance, suggesting an additional impairment in the weight loss therapy.

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1. Introduction

Nonalcoholic fatty liver disease (NAFLD) affects 10% to 39% of the world population, 50% of people with diabetes, 57% to 74% of obese people, and up to 90% of people with morbid obesity [1,2]. In obese adolescents specifically, the estimates of the prevalence reported in the literature are from 22.5% to 52.8% [3]. A number of variables have been associated with NAFLD in the pediatric population, which offer potential clues to the