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Biomarkers of inflammation in obese children: relationship with Vitamin D insufficiency

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Recent epidemiological studies suggest that vitamin D deficiency is associated with increased risk of a wide range of human pathologies including cardiovascular disease. Vitamin D can also have a role in inflammation status through diverse effects on inflammatory cells. Moreover the coexistence of obesity and a low-grade inflammatory state has been largely described. Given that there are potential long-term consequences of obesity and vitamin D deficiency, the overall aim of the present study is to test the hypothesis that suboptimal levels of 25(OH)D are related to inflammatory markers in obese children, such as high-sensitivity C-reactive protein, interleukin 6, tumor necrosis factor- α and myeloperoxidase.

Severely obese 66 Caucasian children between 7 and 14 years of age were recruited. The assessment of obesity was based on the International Obesity Task Force definition. Anthropometry, including weight, height and waist circumference, was performed on the children by standardized methods. Body mass index (BMI) was calculated as weight/height². All subjects selected presented SDS-BMI ≥ 2 . Body composition was determined by a bioelectrical impedance instrument with eight-contact electrodes (BC-418MA; Tanita Europe BV, Hoofddorp, The Netherlands). Blood samples were obtained after a 12-hour fast. High-sensitivity C-reactive protein was measured by kinetic nephelometry (Immage Nephelometer[®], Beckman Coulter Inc. Brea, CA, USA). Interleukin 6, leptin and tumor necrosis factor- α were done in a multiplex immunoassay with MILLIPLEX Map Human Kits (Human Serum Adipokine Panel B, # HADK2-61K-B. Myeloperoxidase levels were determined immunoenzymatically by the Quantikine Human MPO Immunoassay # DMYE00 (R&D Systems Europe, Abingdon, UK) Differences between the groups were analyzed using ANCOVA test adjusted for gender, age, and Tanner stage.

We have found 30% of the subjects ($n = 20$) with serum 25(OH)D concentrations < 20 ng/mL (vitamin D insufficiency). The markers of inflammation myeloperoxidase and interleukin 6 were significantly increased in the group with 25(OH)D values < 20 ng/mL ($p = 0.027$ and $p = 0.036$ respectively).

Inflammatory markers are increased in obese children with vitamin D insufficiency. Supplementation of this vitamin may be undertaken in order to counteract these effects.