

Childhood Obesity and Iron Metabolism

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Introduction: Hypoferremia is the most common nutritional deficiency worldwide and a leading cause of potential developmental disorders in children. Obesity seems to be associated with hypoferremia, but it is unclear if it is caused by depleted iron stores or diminished availability.

Aims: To analyse the relationships between childhood obesity, diet, iron metabolism and inflammation.

Methods: Six months cross-sectional study. Convenience sample of apparently healthy 5 to 6 years old children attended in routine outpatient clinic visits. Evaluated variables: body mass index (BMI), iron intake (7-day diet records previous to the blood sample), serum iron, transferrin receptor, ferritin and C-reactive protein. Data was analyzed using covariance and multiple linear regression models.

Results: 250 patients were attended: 51% female, 96% Caucasian; 32% were overweight and 17% were obese. Characteristics linked to the overweight and obese group ($p < 0.05$): higher heme iron consumption, lower non heme iron and vitamin C ingestion; lower serum iron, iron deficiency (higher transferrin receptor) and inflammation-induced iron sequestration (higher ferritin and C-reactive protein). There

were no differences in total daily iron intake or other dietary factors important to its absorption between groups. High transferrin receptor and iron sequestration contributed independently as predictors of low serum iron. On the other hand neither total dietary iron intake nor BMI were independent predictor factors.

Discussion: As previously demonstrated in adult studies, also in children the hypoferrremia of obesity appears to be explained both by true iron deficiency and by inflammatory-mediated functional iron deficiency. The mechanism of obesity-related inflammation remains unexplained.

Key-words: iron, metabolism, obesity