

Title: Human paraoxonase-1 and adipokines in childhood obesity and lifestyle changes

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ABSTRACT

Childhood obesity is a predisposing factor for adult cardiovascular diseases. Human serum paraoxonase (PON1) may protect against atherosclerosis by hydrolyzing lipid peroxides in oxidized LDL. Alterations and potential correlations of PON1 activities, leptin and adiponectin levels in childhood obesity were studied. We investigated the effect of short-term lifestyle changes on the alteration of PON1 activities, leptin, adiponectin, E-selectin, asymmetric dimethylarginine (ADMA) as atherogenic and antiatherogenic factors in obese children.

We measured PON1 paraoxonase and arylesterase activities, anthropometric parameters, leptin and adiponectin levels in 59 white, obese (obese group-OB: BMI corrected for age: 95,1±3,5 percentile, age: 11,9±1,6 years) and 51 normal-weight children (control group-C: BMI corrected for age: 64,1±8,4 percentile, age: 12,0±3,9 years). Twenty-three white obese and overweight children (age: 11,43±1,78 years; 8 girls, 15 boys) participated in a two-week long lifestyle camp based on diet and exercise program. Overweight and obesity were defined according to the national body mass index reference tables for age and gender.

Obese children had significantly lower PON1 paraoxonase and arylesterase activities, higher leptin and lower adiponectin levels compared to the normal-weight group. PON1 arylesterase activity showed inverse univariate correlation with leptin ($r=-0,29$; $p<0,05$) and positive correlation with adiponectin levels ($r=0,39$; $p<0,01$). In multiple regression analysis adiponectin was strongly associated with PON1 arylesterase activity in obese children ($\beta=0,45$, $p<0,02$). After two-week long supervised diet and aerobic exercise obese children had significantly decreased leptin, ADMA, E-selectin level, whereas they had significantly increased PON1 paraoxonase activity besides the antiatherogenic alteration of the lipid profile and significant weight change. Adiponectin and PON1 arylesterase activity did not change significantly.

Our results emphasize the importance of the investigated metabolic alterations which may have further effects on cardiovascular morbidity and mortality in later adulthood. Altered levels of leptin, adiponectin and PON1 activities may be useful markers beside the general risk factors. Our investigations suggest that modifications in dietary habits and physical activity induce antiatherogenic changes in childhood obesity. These findings highlight the major role of primary prevention and non-pharmaceutical treatment of childhood obesity through lifestyle changes based on diet and increased physical activity.

Keywords: childhood obesity, leptin, adiponectin, PON1, ADMA

Kulcsszavak: gyermekkori elhízás, leptin, adiponektin, PON1, ADMA