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Non-traditional cardiometabolic risk factors in obese children and adolescents with Metabolic Syndrome

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Background: The prevalence of obesity in childhood has increased dramatically during the last decades. Dyslipidemia, hypertension and insulin resistance – all components of the metabolic syndrome (MS) and well-known cardiometabolic risk factors – predispose to the development of inflammation and premature atherosclerotic cardiovascular disease in childhood.

Aim: To determine “non- traditional” cardiometabolic risk factors in obese children and adolescents with and without MS, before and after the implementation of a comprehensive, multidisciplinary, personalized life-style intervention program for 1 year.

Methods: One hundred and forty-nine (*n*=149) children and adolescents [91 males (61.07%), 58 females (38.93%), 32 prepubertal (21.48%), 117 pubertal (78.52%)] attending our ‘Out-patient Clinic for the Prevention and Management of Overweight and Obesity in Childhood and Adolescence’ were studied prospectively. Subjects were classified as having MS (*n*=90; mean age±SE:13.19±0.2 years) or not (*n*=59; mean age± SE: 12.05±0.28 years) according to the International Diabetes Federation criteria for MS. All participants underwent clinical examination, echocardiography, ultrasound of the carotid arteries to determine carotid intima-media thickness and blood sampling for biochemical, endocrinologic and “non-traditional” cardiometabolic risk factors (adiponectin, homocysteine, hs-CRP, leptin, IL-2, IL-4, IL-10, IL-17A, TNF, IFN-γ) at the beginning of the study and following 1-year of a personalized life-style intervention program.

Results: Systolic (SBP) and diastolic (DBP) blood pressure were significantly higher in children with MS (127.04±1.28 and 74.91±1.02mmHg, respectively) than those without MS (114.3±1.09 and 68.35±1.13mmHg, *P*<0.05) and improved significantly in children with MS after 12 months’ intervention. Interventricular septal end systole (IVSs) was significantly higher in the MS group than the control group both at baseline (9.67±0.30 vs. 8.47±0.25mm, *P*<0.05) and after intervention (9.63±0.28 vs.8.58±0.24mm, *P*<0.05). Mean Right Common Carotid Artery (RCCA) was significantly higher in the MS group than the control group at baseline (0.65±0.02 vs.0.50±0.02mm, *P*<0.05), and decreased significantly in the MS group after 12 months’ of intervention. Mean Left Common Carotid Artery (LCCA) did not differ significantly among groups. The proinflammatory cytokines IL-2, IL-6, TNF, IL-17A, IFN-γ were significantly higher at baseline in the MS group than the control group. Triglyceride concentrations at initial assessment were the best positive predictor of mean LCCA (β:0.37), while SBP followed by triglyceride concentrations at initial assessment were the best positive predictor of mean RCCA (β:0.25 and β:0.22, respectively).

Conclusion: Our findings indicate increased cardiometabolic risk in children with MS, as well as an improvement in cardiovascular parameters and cytokines following intervention.

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