

Editorial

Is Adiponectin New Important Parameter in Adolescents with Metabolic Syndrome?

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Introduction

Metabolic Syndrome (MS) represents a cluster of cardiovascular risk factors hypertension, obesity, diabetes and dyslipidemia. It has been showed that MS in childhood and adolescence is a significant risk factor for adverse outcomes later in life. Although the obesity prevalence significantly increases in last several decades, the latest studies revealed a linear trend of decreasing MS severity in US and Canadian adolescents [1,2]. The decrease in MS severity appeared to be due to trends in increasing High-Density Lipoprotein (HDL) and decreasing triglyceride. The other authors claim that this is the consequence of different MS definitions usage [3].

The central role of the MS is insulin resistance and abdominal obesity. Previous investigations showed unfavorable effect of obesity on cardiac structure, function and mechanics in childhood [4]. This remodeling is related with different hemodynamic and biohumoral changes including activation of sympathetic nervous system and renin-angiotensin system [4]. However, many other biohumoral markers contribute to cardiovascular changes in MS. Recent systematic review revealed that the concentrations of pro-inflammatory cytokines (IL-6, TNF- α), markers of pro-oxidant status (OxLDL, uric acid), Pro-thrombotic factors (PAI-1) and leptin were elevated, whereas concentrations of anti-inflammatory cytokines (IL-10), adiponectin, ghrelin and antioxidant factors (PON-1) were reduced in subjects with MS [5].

It has been already known that adiponectin, as a protein hormone, modulates a number of metabolic processes, including glucose regulation and fatty acid oxidation. In the recently published study

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Shafiee et al., investigated the relationship between MS and adiponectin level in 180 adolescents [6]. The authors claimed that adiponectin gradually decreased with the number of MS criteria. Thus, the patients with no MS criteria had the highest value of adiponectin, patients with 1-2 MS criteria had intermediate adiponectin level, whereas MS participants had the lowest adiponectin level, suggesting that the level of insulin resistance gradually increased from subjects without MS criteria to those with at least 3 MS criteria. Importantly, MS was defined according to the adult treatment panel III criteria modified for the pediatric age group. The authors reported significant correlations between adiponectin concentrations and metabolic parameters, except blood pressure. Interestingly, there was no a difference between genders in these correlation analyses. MS remained correlated with adiponectin level in adolescents even after adjustment for age, BMI, total cholesterol and waist circumference [6].

These findings have been previously demonstrated in adult population with MS [7]. However, the results of the latest studies regarding the importance of adiponectin and its relationship with cardiovascular outcome are surprising and unexpected. Namely, one would expect that lower levels of adiponectin are associated with increased glucose intolerance and elevated cardiovascular risk. Nevertheless the newest investigations showed completely opposite situation. The Dallas heart study revealed that higher adiponectin level is associated with increased mortality and cardiovascular morbidity in a young, multiethnic population across all subgroups defined by age, gender, race, obesity, diabetes, MS, or elevated high-sensitivity C-reactive protein. The similar findings were recently detected in hemodialysis and diabetic patients [8-10]. These findings are paradoxical considering the fact that large studies showed that adiponectin inversely correlated with insulin and HOMA index - index of insulin resistance [11]. This unexpected direct correlation between high serum adiponectin levels and increased cardiovascular mortality is predominantly based on a cause - effect relationship that potentiates role of adiponectin action and metabolism on atherosclerotic processes. Other study tried to explain the relationship between adiponectin and mortality by the renal function [10]. Namely, the authors found a significant adiponectin-mortality association only in individuals with normal renal function ($GFR \geq 60 \text{ ml/min/1.73 m}^2$), but not in those with $GFR < 60 \text{ ml/min/1.73 m}^2$.

The importance of the investigation published by Shafiee et al., lies in the fact that adiponectin level could predict the further development of insulin resistance and diabetes in subjects with MS [6]. The authors confirmed that adiponectin represents a multifunctional protein with pleiotropic insulin-sensitizing effects and a key molecule in the pathogenesis of MS. Additional advantage of this research is the fact that the authors studied Iranian population and showed that the results regarding adiponectin could be applied in multiethnic population. However, further longitudinal studies are needed to confirm the clinical importance of adiponectin assessment and its predictive value in MS subjects.

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