

Risk assessment of cardiovascular disease in Young adults affected by the metabolic syndrome using the Correlation between plasma total cholesterol/high-density lipoprotein cholesterol ratio and other biological variables

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Background and Aim: The correlation between distinct variables in selected pathological situations may contribute to the identification of possible cause-to-effect links. In such a perspective, the present study refers to the correlation between the plasma TC/HDL-C ratio as dyslipidemia related-insulin resistance key predictor and selected markers of MetS in young adults. **Materials and methods:** The population under study, i.e. a cohort of 100 patients (60 men and 40 women) aged between 30 and 40 years, living in western Algeria and affected by the MetS. Fifteen classical markers of the latter syndrome, as well as BMI, were measured both in the patients and in 20 control subjects of the same age. The patients were considered as non-diabetic or diabetic based on their plasma glucose concentration below or above 7.0 mM. The strength between the plasma TC/HDL-C ratio and other parameters of MetS were quantified using Pearson correlation coefficient (r). **Results:** The TC/HDL-C ratio averaged 5.34 ± 0.08 and 4.26 ± 0.08 in male and female patients, as distinct ($p < 0.001$) from 2.82 ± 0.09 in control subjects. Four correlations achieved statistical significance in both male and female, i.e. those concerning the TC/HDL-C and either LDL-C, TGs, BMI or hs-CRP, here mentioned in order of decreasing probability. Incidentally, in the male subjects, significant correlations were also observed between the TC/HDL-C ratio and adiponectin, TNF- α , leptin, HOMA, IL-6 and GLP-1, the latter two correlations yielding a negative Pearson r . Likewise, comparable correlation results were recorded in the diabetic patients, but not so in the non-diabetic patients.

Urinary calcium excretion is used to evaluate various clinical conditions, such as idiopathic Metabolic syndrome (MetS) is characterized by cardiovascular and metabolic derangements including abdominal obesity, impaired fasting glucose, hypertension, and dyslipidemia. It is considered to indicate a state of chronic inflammation resulting from visceral fat accumulation and development of insulin resistance.

MetS is a well-known risk factor for cardiovascular disease and type 2 diabetes mellitus in both children and adults. Because childhood MetS often leads to adulthood MetS, early detection and management of MetS in the pediatric population are critical to prevent the development of cardiovascular disease in later life.

Despite the clinical importance of MetS, determining individuals who are predisposed to MetS is difficult due to a lack of consensus regarding the cutoff value for MetS in children and adolescents. Cutoff value for triglycerides (TG) in children and adolescents proposed by the International Diabetes Federation (IDF) criteria is 150 mg/dL, while that suggested by the modified National Cholesterol Education Program, Adult Treatment Panel III is 110 mg/dL. This considerable gap in cutoff could be due in part to changes in lipid profiles according to age and sex during adolescence, which make it hard to determine a meaningful cutoff value for dyslipidemia in terms of cardiovascular disease risk. In adults, lipid ratios, such as the TG to high-density lipoprotein cholesterol (HDL-C) ratio and total cholesterol (TC) to HDL-C ratio are widely used for cardiovascular disease risk assessment. These ratios indicate the balance between all atherogenic cholesterol (very low-density lipoprotein cholesterol [VLDL-C], intermediate-density lipoprotein cholesterol, low-density lipoprotein-cholesterol [LDL-C]) and antiatherogenic cholesterol (HDL-C), which is a major determinant of cardiovascular risk. Previous large-scale prospective studies had shown that the TC/HDL-C ratio can be a reliable predictor of coronary heart disease and death. Meanwhile, insulin resistance is accompanied by excessive production of VLDL-C from the liver and chemical transformation of HDL particles resulting in more rapid excretion from the kidneys, resulting in changes in lipid profiles such as elevation of TG and a decrease in HDL-C. In this context, TG/HDL-C ratio has been shown to be directly associated with insulin resistance and cardiovascular events in adults, and has also been demonstrated to be related to

insulin resistance and carotid artery intima-media thickness in both adults and children

A recent study demonstrated a strong relationship between TC/HDL-C and TG/HDL-C ratios and MetS in the adult population in Korea, but optimal cutoff values and predictive values of these lipid ratios for MetS have not been presented. We hypothesized that TG/HDL-C and TC/HDL-C ratios may be appropriate markers of MetS in adolescents, and that their cutoff values could be useful for early detection of MetS. We designed this study to examine the age and sex-related distribution of TG/HDL-C and TC/HDL-C ratios and to determine their optimal cutoff values as surrogate markers for MetS in Korean adolescents.

Conclusion: The selection of the TC/HDL-C ratio as a key variable was motivated by its relevance to atheromatous complications. The close correlations between this ratio and either LDL-C, TGs or BMI reinforce the concept of a close interdependency between obesity, hyperlipidemia and cholesterol status suggesting TC/HDL-C ratio as a relevant marker for the MetS severity in clinical practice in term of cardiovascular risk assessment.