Associations between lipid parameters and insulin resistance in obese adolescents

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Background: Non-communicable disease epidemic is directly related to the dislipidemia and insulin resistance (IR) that associated with acute cardiovascular events. Meanwhile, there is not much has known about interrelation between this parameters in pediatric patients.

Purpose: of the study is to analyze associations between lipids and insulin resistance so as to screen high risk subjects during adolescence.

Subjects and Methods: 215 adolescents (mean age is 14,03+2,21 y.o) with no gender difference were examined. Lipids assessment included measurement of total cholesterol (TC), triglycerides (TG), low density lipoproteins (LDL), high density lipoproteins (HDL). Guideline on the management of high blood cholesterol (ACC, 2018) was used for distributing lipid parameters by the groups: acceptable, borderline and abnormal (high). Insulin resistance (IR) was analyzed by HbA1C level, fasting glucose (FG) and fasting insulin (FI) measurement followed by HOMA-IR calculation. Fasting status (at least 8 hours) was required. Standard statistics (SPSS soft) used for the data analysis.

Results: We have established that about half (46,51%) of obese adolescents have acceptable TC level, about one third (29,30%) - borderline and just quarter of them (24,19%) were hyperlipidemic.

TG are high in 48,15%, borderline in 40% and acceptable just in 11,85%. HDL are borderline low in 84,61%, acceptable in 3,07% and high in 12,32%.

LDL are acceptable in vast majority of overweight (77,90%) with the equal distribution of borderline and high results (by 11,05%).

Increasing of TC is associated with FG (4,61; 4,74; 5,20, p=0,003), FI (24,06; 25,31; 29,28, p=0,02) and HOMA-IR (3,90; 4,94; 5,67, p=0,003), HbA1C(6,23; 6,62; 7,13, p< 0,05) Increasing of LDL is associated with HOMA-IR (4,26; 5,13; 7,82, p<0,01), FI (25,07; 23,80; 33,83, p = 0,01)

Decreasing HDL is associated with HOMA-IR (2,26; 5;96; 5,86, p=0,003)

Conclusions:

• Just one forth of obese children is hyperlipidemic, whereas dislipidemias with high TG and borderline HDL are common.

• Fasting relationships between FG and FI (by HOMA-IR) are crucial for all lipid parameters shift in obese adolescents. Moreover, seems, insulin sensitivity drop down could b causative for the HDL decline.

• Hyperlipidemia and high TG are related to the diabetes mellitus