

## Dyslipidemia in school-children

### *Okul çocuklarında dislipidemi*

Non-high-density lipoprotein (HDL) cholesterol is defined as the difference between total and HDL cholesterol and includes potential proatherogenic apolipoprotein B-containing particles such as low-density lipoprotein (LDL), intermediate-density lipoprotein and very-low-density lipoprotein as well as chylomicron remnants and lipoprotein (a) (1). It has been reported that there is a significant relationship between non-HDL cholesterol and cardiovascular morbidity and mortality, and that non-HDL cholesterol levels strongly predict cardiovascular outcomes. Therefore, screening for non-HDL cholesterol levels has been suggested for cardiovascular disease risk assessment (2). In the third Adult Treatment Panel of the National Cholesterol Education Program, non-HDL cholesterol level has been recommended as a secondary target in lipid lowering therapy after achieving control of LDL cholesterol in patients with diabetes mellitus or metabolic syndrome (MetS) (3). Non-HDL cholesterol levels can also be useful for lipoprotein related risk assessment in children (4). Bogalusa Heart Study (5), which was a community-based study, demonstrated that the childhood level of non-HDL cholesterol, like LDL cholesterol, predicted adult dyslipidemia and other cardiovascular risks. In that study, non-HDL cholesterol levels were associated with increased prevalence of obesity and high levels of LDL cholesterol and triglycerides as well as other MetS parameters including hyperglycemia, hyperinsulinemia and low HDL cholesterol levels in adulthood (5).

Metabolic syndrome is a cluster of risk factors including abdominal obesity, hypertension, hyperglycemia, high levels of triglycerides and low levels of HDL cholesterol (6). Epidemiological studies demonstrated very high prevalence of MetS and abdominal obesity with a tendency for even further increase among Turkish adults (7, 8). Similar to the adult population, it is also well known that the frequency of MetS and obesity is rapidly increasing among children (9). This increase is often attributed to genetic factors as well as obesity (particularly abdominal obesity) due to physical inactivity and unbalanced over nutrition imposed by modern way of living (6). In a longitudinal assessment, Morrison et al found a strong relation between abdominal obesity and the development of MetS among black and Caucasian adolescent girls (10). In a study by Serap et al (11), 74.4% of obese children had 1, 2 or 3 risk factors for MetS, whereas this rate was quite lower among healthy children. In that study, a close relation was demonstrated between MetS and childhood obesity.

In a study conducted with Turkish school children and published in the December issue of Anadolu Kardiyoloji Dergisi (12),

it was reported that the dyslipidemia prevalence according to non-HDL cholesterol was similar with dyslipidemia prevalence according to LDL cholesterol. This finding supports the information that non-HDL is a reliable parameter for the prediction of future cardiovascular disease risk. The higher levels of non-HDL cholesterol among girls compared to boys, and regardless of gender, its negative correlation with age and HDL cholesterol levels, and its positive correlation with other lipid parameters are all together in line with the results of the Bogalusa Heart Study (4).

Turkish Heart Study (13) and Turkish Adult Risk Factor Study (TEKHARF) (14) demonstrated that total cholesterol and LDL cholesterol levels were not higher among Turkish population compared to other populations; however low HDL cholesterol levels accompanied by high levels of triglycerides was an important risk factor for coronary artery disease among this population. In Turkish School Children Study (12), similar total and LDL cholesterol levels compared to other populations, and the increase in triglyceride levels despite a decrease in HDL cholesterol levels from the age of 17, particularly in boys, all seem to be consistent with previous epidemiological data. Low HDL cholesterol accompanied by high level of triglycerides are known to be closely associated with abdominal obesity and insulin resistance, thus with MetS (6). Although not supported with recent studies (7, 15), it is suggested that HDL cholesterol levels may be lower in Turkish adults compared to other populations (13, 14) and this may be associated with genetic factors (13) and MetS (16). Although MetS parameters other than HDL cholesterol and triglycerides was not evaluated in Turkish School Children Study (12), the decrease in HDL cholesterol and the increase in triglycerides with increasing age suggests that MetS may have a role on these results.

In conclusion, this valuable study found a high prevalence of dyslipidemia among children and suggests that non-HDL cholesterol levels may be used for detection of dyslipidemia in this age group. However, better interpretation of the present studies' results warrants larger and more comprehensive studies involving genetic investigations and evaluation of parameters other than lipid measurements, such as blood pressure, fasting blood glucose and obesity (abdominal obesity in particular).

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