

Abstract

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Distribution of LDL particle size in a population-based sample of children and adolescents and relationship with other cardiovascular risk factors.

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BACKGROUND: Smaller, denser LDL particles are associated with an increased risk for cardiovascular diseases (CVD). In youths, data on the distribution of LDL particle size and on its association with other CVD risk factors are limited.

METHODS: We determined LDL peak particle size by nondenaturing 2%-16% gradient gel electrophoresis in a representative sample of 2249 youths 9, 13, and 16 years of age who participated in a school-based survey conducted in 1999 in the province of Quebec, Canada. Standardized clinical measurements and fasting plasma lipid, glucose, and insulin concentrations were available.

RESULTS: The LDL peak particle size distribution was gaussian. The 5th, 50th (median), and 95th percentiles by age and sex were 255.5-258.6, 262.1-263.2, and 268.1-269.5 Å, respectively. The prevalence of the small, dense LDL phenotype (LDL peak particle size \leq 255 Å) was 10% in participants with insulin resistance syndrome (IRS), in contrast to 1% in those without IRS. In a multiple regression analysis, the association of LDL size with other CVD risk factors [apolipoprotein B, HDL-cholesterol (HDL-C), triglyceride (TG), and insulin concentrations, and body mass index] was strongest with TG and HDL-C concentrations: a 1 SD increase in log(e)-transformed TG concentration was associated with a 1.2 Å reduction in LDL size, and a 1 SD increase in HDL-C was associated with a 1.1 Å increase in LDL size.

CONCLUSIONS: Although the small, dense LDL phenotype is less prevalent in youths than adults, its prevalence is clearly increased in childhood IRS. Metabolic correlates of LDL size are similar in youths and adults.

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