

Abstract

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Association between circulating oxidized low-density lipoprotein and incidence of the metabolic syndrome.

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CONTEXT: Experimental data support the hypothesis that oxidized low-density lipoprotein (LDL) is associated with the metabolic syndrome. However, this hypothesis has not been tested in humans.

OBJECTIVE: To establish the relation of oxidized LDL with metabolic syndrome in the general community.

DESIGN, SETTING, AND PARTICIPANTS: The Coronary Artery Risk Development in Young Adults (CARDIA) study is a population-based, prospective, observational study. We studied 1889 participants who were between the ages of 18 and 30 years at the time of recruitment in 1985 and 1986 and living in 1 of 4 US metropolitan areas (41% African American; 56% women) and were seen both at year 15 (2000-2001, ages 33-45 years) and year 20 examinations (2005-2006).

MAIN OUTCOME MEASURE: The longitudinal association of oxidized LDL and incident metabolic syndrome. Oxidized LDL was measured with a monoclonal antibody-based enzyme-linked immunosorbent assay. The metabolic syndrome was defined according to the Adult Treatment Panel III of the National Cholesterol Education Program.

RESULTS: Incident metabolic syndrome was diagnosed at the year 20 follow-up in 12.9% (243 of 1889) of participants who did not have metabolic syndrome at the 15-year follow-up. The odds ratios (ORs) for incident metabolic syndrome after 5 years' follow-up and adjusted for age, sex, race, study center, cigarette smoking, body mass index, physical activity, and LDL cholesterol levels by quintiles of oxidized LDL were 2.1 (95% confidence interval [CI], 1.1-3.8) for the second quintile (55.4-69.1 U/L); 2.4 (95% CI, 1.3-4.3) for the third quintile (69.2-81.2 U/L); 2.8 (95% CI, 1.5-5.1) for the fourth quintile (81.3-97.3 U/L); and 3.5 (95% CI, 1.9-6.6) for the fifth quintile (> or =97.4 U/L). The adjusted ORs for incidence of dichotomous components of metabolic syndrome in the highest vs the lowest quintile of oxidized LDL were 2.1 (95% CI, 1.2-3.6) for abdominal obesity, 2.4 (95% CI, 1.5-3.8) for high fasting glucose, and 2.1 (95% CI, 1.1-4.0) for high triglycerides. Low-density lipoprotein cholesterol was not associated with incident metabolic syndrome or with any of its components in the fully adjusted model containing oxidized LDL.

CONCLUSION: Higher concentration of oxidized LDL was associated with increased incidence of metabolic syndrome overall, as well as its components of abdominal obesity, hyperglycemia, and hypertriglyceridemia.

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