Abstract

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LDL particle number and risk of future cardiovascular disease in the Framingham Offspring Study—Implications for LDL management.

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BACKGROUND: The cholesterol content of low-density lipoprotein (LDL) particles is variable, causing frequent discrepancies between concentrations of LDL cholesterol (LDL-C) and LDL particle number (LDL-P). In managing patients at risk for cardiovascular disease (CVD) to LDL target levels, it is unclear whether LDL-C provides the optimum measure of residual risk and adequacy of LDL-lowering treatment.

OBJECTIVE: To compare the ability of alternative measures of LDL to provide CVD risk discrimination at relatively low levels consistent with current therapeutic targets.

METHODS: Concentrations of LDL-C and non–HDL-C were measured chemically and LDL-P and VLDL-P were measured by nuclear magnetic resonance in 3066 middle-aged white participants (53% women) without CVD in the Framingham Offspring cohort. The main outcome measure was incidence of first CVD event.

RESULTS: At baseline, the cholesterol content per LDL particle was negatively associated with triglycerides and positively associated with LDL-C. On follow-up (median 14.8 years), 265 men and 266 women experienced a CVD event. In multivariable models adjusting for nonlipid CVD risk factors, LDL-P was related more strongly to future CVD in both genders than LDL-C or non–HDL-C. Subjects with a low level of LDL-P (<25th percentile) had a lower CVD event rate (59 events per 1000 person-years) than those with an equivalently low level of LDL-C or non–HDL-C (81 and 74 events per 1000 person-years, respectively).

CONCLUSIONS: In a large community-based sample, LDL-P was a more sensitive indicator of low CVD risk than either LDL-C or non–HDL-C, suggesting a potential clinical role for LDL-P as a goal of LDL management.