

# Abstract

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## Small dense low-density lipoprotein cholesterol concentration and carotid atherosclerosis.

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**BACKGROUND:** Low-density lipoprotein cholesterol (LDL-C) and the small dense LDL (SdLDL) phenotype are both predictors for ischemic heart disease.

**OBJECTIVE:** We examined whether cholesterol of SdLDL (SdLDL-C) is more closely associated with carotid artery intima-media thickness (CA-IMT), a surrogate measure of atherosclerosis, than LDL-C and other lipid parameters.

**DESIGN AND METHODS:** The subjects were 326 consecutive participants including those with dyslipidemia, diabetes mellitus, hypertension, chronic kidney disease, and smokers. SdLDL-C was quantified by a newly developed precipitation method, and CA-IMT by high-resolution B-mode ultrasound.

**RESULTS:** In univariate analysis, CA-IMT was most strongly correlated with SdLDL-C (Spearman's  $r=0.441$ ,  $P<0.001$ ), followed by apolipoprotein (apo) B, LDL-C, non-high-density lipoprotein cholesterol (Non-HDL-C), and plasma triglycerides (TG). HDL-C and apo A-I were inversely correlated with CA-IMT. Non-lipid variables that were associated with CA-IMT were age, sex, presence of diabetes mellitus, presence of hypertension, estimate glomerular filtration rate (eGFR), and C-reactive protein (CRP). Even after adjustment for age, sex, diabetes mellitus, hypertension, smoking, eGFR and CRP, the positive association of CA-IMT with SdLDL-C remained significant, and again stronger than the associations with other lipid parameters. Further analyses revealed that the level of SdLDL-C was elevated in subgroups of the subjects including men, older subjects, smokers, those with higher CRP levels, those with diabetes mellitus, and hypertensive patients.

**CONCLUSION:** These results indicate that SdLDL-C was the best marker of carotid atherosclerosis among the lipid parameters tested, and suggest that quantitative measurement of SdLDL-C gives useful information in the risk assessment for atherosclerotic disease.

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