Which Is More Predictive of Cardiovascular Diseases?
LDL Cholesterol, Total Cholesterol versus HDL Ratio or Other Lipid Parameters

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The causal relationship between blood cholesterol, especially LDL cholesterol, and atherosclerosis is no longer in doubt. The Adult Treatment Panel (ATP) III guidelines continue to recommend LDL cholesterol as the prime index of risk and the main target for cholesterol-lowering therapy. Given that LDL is the major atherogenic lipoprotein, other lipoprotein species (VLDL, IDL, lipoprotein [a], and HDL) nonetheless appear to be involved in the atherogenic process. The ATP III has also acknowledged the importance of the atherogenic role of non-HDL cholesterol and recommended it as the secondary target for cholesterol-lowering therapy in individuals with elevated serum triglyceride levels ($\geq$200 mg/dL).

However, there is a substantial controversy regarding using LDL cholesterol alone as the risk-categorizing variable in clinical practice. For example, it is not certain whether subjects with high levels of both HDL and LDL cholesterol are associated with a higher risk for coronary heart disease (CHD). The same problem confronts clinicians in managing subjects with low levels of both HDL and LDL cholesterol. Several large-scale epidemiological studies, including the Chin-Shan Community study in Taiwan, have shown that the total cholesterol/HDL ratio, rather than LDL cholesterol, is the best lipoprotein variable in predicting the risk of CHD. Using the ratio of total to HDL cholesterol as the initial screening tool can largely abrogate the controversy associated with current guidelines. Compared with LDL/HDL cholesterol ratio and non-HDL cholesterol, the total cholesterol/HDL ratio most comprehensively reflects the overall balance between atherogenic and antiatherogenic lipoproteins.

Statin treatment to reduce risk of atherosclerotic cardiovascular disease is well established. Meta-analysis of data from large randomized clinical trials shows that the clinical benefits of statin treatment relate chiefly to the absolute reduction of LDL cholesterol achieved irrespective of the initial lipid profile. Nevertheless, in the post hoc analysis of data from the LIPID trial, both baseline and on-treatment total cholesterol/HDL ratios are more significant predictors for subsequent CHD than on-treatment LDL cholesterol. Whether on-treatment total cholesterol/HDL ratio could be used or superior to LDL cholesterol as a target for statin therapy deserves further investigation. As the case of total cholesterol/HDL ratio, the roles of apolipoprotein B/Apolipoprotein A1 ratio in predicting vascular risks and assessing therapeutic effects are also under extensive studies.