Relationship between serum concentrations of cholesterol in 20 lipoprotein subfractions and cholesterol absorption and synthesis markers in patients with hypercholesterolemia

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Determining cholesterol distribution in lipoprotein subfractions is an important approach to measure the magnitude of the risk for atherosclerotic diseases including coronary heart disease and stroke. Hypercholesterolemia is caused by excess of cholesterol absorption in the intestine and/or synthesis in the liver (otherwise decreased clearance). The aim of this study was to investigate the relationship between cholesterol distribution in lipoprotein subfractions and cholesterol absorption and synthesis markers.

Serum samples were obtained from 100 male and female patients with untreated hypercholesterolemia to measure lipid levels including serum sterols (campesterol, sitosterol, cholestanol as cholesterol absorption markers and lathosterol as a cholesterol synthesis marker) and cholesterol levels in 20 lipoprotein subfractions (2 chylomicrons, 5 VLDLs, 6 LDLs, and 7 HDLs) by high performance liquid chromatography.

Total cholesterol and whole LDL cholesterol levels had significantly positive correlations with all cholesterol absorption and synthesis markers. However, for lipoprotein subfractions, campesterol, sitosterol, and cholestanol levels had significantly positive correlations with cholesterol levels in large LDLs (r=0.23~0.47, p<0.05) and large HDLs (r=0.31~0.48, p<0.05), while lathosterol levels had significantly positive correlations with those in chylomicrons (r=0.37~0.47, p<0.001), large VLDLs (r=0.26~0.51, p<0.01), and small LDLs (r=0.25~0.31, p<0.01).

Serum levels of cholesterol synthesis marker correlate positively with not only VLDLs and LDLs but also chylomicrons. Lipoprotein subfractions whose cholesterol levels had positive correlation with cholesterol absorption markers have been believed to be antiatherogenic, while those correlated cholesterol synthesis markers to be atherogenic. Hypercholesterolemic patients with high cholesterol synthesis marker may have greater residual risk for atherosclerosis than absorbers.