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Lipoprotein Subclasses Independently Contribute to Subclinical Variance of Microvascular and Macrovascular Health

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Lipoproteins are important cardiovascular (CV) risk biomarkers. This study aimed to investigate the associations of lipoprotein subclasses with micro- and macrovascular biomarkers to better understand how these subclasses relate to atherosclerotic CV diseases. One hundred and fifty-eight serum samples from the EXAMIN AGE study, consisting of healthy individuals and CV risk patients, were analysed with nuclear magnetic resonance (NMR) spectroscopy to quantify lipoprotein subclasses. Microvascular health was quantified by measuring retinal arteriolar and venular diameters. Macrovascular health was quantified by measuring carotid-to-femoral pulse wave velocity (PWV). Nineteen lipoprotein subclasses showed statistically significant associations with retinal vessel diameters and nine with PWV. These lipoprotein subclasses together explained up to 26% of variation ($R2 = 0.26$, $F(29,121) = 2.80$, $p < 0.001$) in micro- and 12% ($R2 = 0.12$, $F(29,124) = 1.70$, $p = 0.025$) of variation in macrovascular health. High-density (HDL-C) and low-density lipoprotein cholesterol (LDL-C) as well as triglycerides together explained up to 13% ($R2 = 0.13$, $F(3143) = 8.42$, $p < 0.001$) of micro- and 8% ($R2 = 0.08$, $F(3145) = 5.46$, $p = 0.001$) of macrovascular variation. Lipoprotein subclasses seem to reflect micro- and macrovascular end organ damage more precisely as compared to only measuring HDL-C, LDL-C and triglycerides. Further studies are needed to analyse how the additional quantification of lipoprotein subclasses can improve CV risk stratification and CV disease prediction.
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