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Atherogenic Indices as Surrogate Biomarkers of Subclinical Atherosclerosis and Cardiovascular Risk

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ABSTRACT

Atherosclerosis which has its beginning early in life, is a chronic inflammatory disease. Diagnosing atherosclerosis often at an advanced stage is mostly an incidental finding of a cardiovascular event, with probable fatal outcomes. Hence detecting early atherosclerotic changes is important. Increased expression of adhesion molecules promoted by high triglyceride (TGL) and LDL levels is associated with early changes of atherosclerosis visualized as an increase in carotid intima media thickness (CIMT). Due to variable degree of chronic inflammation, individual lipid parameters may fluctuate making the impact of such changes on cardiovascular disease (CVD) risk less clear. In this scenario, lipid ratios have been found to more reliable to assess CVD risk as they are less susceptible to fluctuations. Castelli's Risk Index (CRI-I) calculated as total cholesterol (TC)/ HDL also known as cardiac risk ratio and CRI-II calculated as LDL/HDL have been reported to be associated with CIMT. Atherogenic coefficient (AC) calculated as TC-HDL/HDL is reflective of the atherogenic potential of the lipoproteins. Atherogenic index (AI) calculated as log of (TGL/HDL) reflects balance between atherogenic and protective lipoproteins and is said to correlate with small dense LDL levels and lecithin cholesterol acyl transferase activity, an indicator of cholesterol esterification. Non-HDL calculated as TC-HDL has been opined to have many advantages such as it does not deal with the relationship between VLDL and triglycerides, can be assessed in patients with triglyceride levels more than 400 mg/dL. As these atherogenic indices are found to correlate with CIMT and considering the cost factor for some important biomarkers for atherosclerosis and imaging techniques, atherogenic indices can be considered as surrogate biomarkers of subclinical atherosclerosis and cost-effective predictors of CVD risk.

Keywords: Atherosclerosis, Chronic inflammatory disease, Cardiovascular disease (CVD), Triglycerides (TGL), Lipoproteins

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