Combination Eicosapentaenoic Acid and Statin Treatment Reversed Endothelial Dysfunction in HUVECs Exposed to Oxidized LDL

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Abstract

Objective: Endothelial dysfunction is a clinically relevant and causative biomarker of vascular disease. The impact of dietary modifications on endothelial dysfunction is not well defined. Here, we report the effects of eicosapentaenoic acid (EPA), a naturally available and structurally distinct omega-3 fatty acid, in combination with statins, on oxidized low-density lipoprotein (oxLDL)-induced endothelial dysfunction.

Background: Oxidized LDL is a key player in the development of atherosclerosis and is a causative agent of endothelial dysfunction. In atherosclerotic plaques, LDL becomes modified and loses its lipophilic core, which facilitates interaction with apoE receptors and uptake by macrophages. Oxidized LDL is also capable of promoting the migration and infiltration of inflammatory cells, which release reactive oxygen species (ROS). These ROS can impair endothelial NO production, leading to impaired vascular response and increased risk of cardiovascular disease.

Method: HUVECs were treated with oxLDL (50 µg/mL) and DMSO (1 mM) as a control for 24 hours at 37°C, and the NO/ONOO– release was measured metrically (234 nm) over a period of 24 hours until complete.

Result: Separate treatments with EPA or ATM decreased NO/ONOO– release by 53% (550 ± 26 nM) and 40% (550 ± 26 nM) as compared to vehicle-only control, indicating that EPA and ATM apically and in a dose-dependent manner reversed oxLDL-induced NO/ONOO– release.

Conclusion: EPA and ATM were found to be effective in the prevention of oxLDL-induced endothelial dysfunction and to decrease oxLDL-induced NO/ONOO– release.

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References