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ATVB11 / 110 - Coronary Atheroma Regression from Serial Infusions of Autologous Selectively Delipidated Preβ-HDL-enriched Plasma on Coronary Atheroma in Patients With Homozygous Familial Hypercholesterolemia in the HALO-FH Trial

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Abstract

Background: Lipid-rich plaques are prone to rupture causing major adverse cardiac events (MACE). Selective delipidation of plasma via HDL Therapeutics PDS-2™ System converts *a*HDL to preβ-HDL, the most effective form of HDL for cholesterol removal from arterial plaques

Objective: To determine the effect of 7 weekly serial infusions of autologous selectively delipidated preβ-HDL-enriched plasma on coronary atheroma, assessed by quantitative coronary computed tomography angiography (CCTA), in patients with homozygous familial hypercholesterolemia (HoFH).

Methods: Open-label study of 6 subjects with HoFH at 3 centers. Inclusion criteria were subclinical atherosclerosis (≥20% luminal stenosis) on baseline CCTA, stable lipid-lowering therapy for ≥ 4 weeks prior, and meeting criteria for serial apheresis. All subjects received 7 weekly infusions of autologous selectively delipidated preβ-HDL-enriched plasma and baseline and final CCTA. The primary endpoint was the quantitative atheroma cross-sectional area for each plaque, and plaque composition. Plasma prior to and after each infusion was subjected to gel electrophoresis for preβ-HDL particle levels.

Results: 16 coronary plaques were identified. The primary endpoint was met with a statistically significant 18% reduction in total atheroma cross-sectional area between baseline and follow-up (9.9±3.5 vs. 8.2±2.4 mm^2; P=0.023). This included a 20% reduction of noncalcified plaque (P=0.015), and reductions in the low-density (-38%; P=0.005) and necrotic core (-33%; P=0.007) components. The percentage of preβ-HDL particles levels increased significantly (p<0.001) by 65.92%.

Conclusion: We observed coronary atheroma regression after 7 weekly serial infusions of autologous selectively delipidated preβ-HDL-enriched plasma in patients with HoFH. This was accompanied by an increase in preβ-HDL particles levels and a reduction in the low-density and necrotic core plaque portions (i.e. those associated with high-risk plaques prone to rupture and higher rates of MACE).
Clinical Implications: Autologous selectively delipidated preβ-HDL-enriched plasma is the first of its kind treatment to rapidly reverse coronary atherosclerosis in patients with HoFH who are at increased risk for MACE.

Disclosures

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