SHORT-TERM EXERCISE TRAINING CHANGES TRIGLYCERIDES MOLECULAR CONTENT OF THE LDL AND HDL PARTICLES AFFECTING THEIR FUNCTIONAL CHARACTERISTICS IN METABOLIC SYNDROME

Poster Contributions
Poster Sessions, Expo North
Saturday, March 09, 2013, 3:45 p.m.-4:30 p.m.

Background: Long-term exercise training associated with diet changes lipoproteins plasma levels.

Objectives: We sought to investigate the effects of short-term exercise training without any specific diet (T) on the concentration, composition and functional characteristics of LDL and HDL particles in patients with metabolic syndrome (MS).

Methods: Forty sedentary persons (30 MS and 10 controls) were studied. Twenty of those with MS were subjected to a 3 times/week controlled training load (45 min/day) for 3 months on a bicycle ergometer. LDL and HDL subfractions were obtained by plasma ultracentrifugation and their compositions were analyzed. The in vitro resistance to oxidation of the LDL from the patients with MS (before and after T) was verified. A control LDL was incubated with HDL2a and HDL3b from the patients with MS (before - after T) and the in vitro resistance to oxidation was verified. An artificial lipoprotein emulsion (LDE) labeled with 14C-phospholipid, 3H-triglycerides, 14C-cholesterol and 3H-cholesteryl ester was incubated with plasma from the participants. After precipitation of VLDL, LDL and LDE, the HDL-containing supernatant was counted for radioactivity, to verify the HDL ability to accept lipids.

Results: T decreased triglycerides (TG) but did not change LDL-C and HDL-C plasma levels. The LDL resistance to oxidation of the MS group increased (+91%) after T, associated with a significant decrease in the LDL-particles content of TG (-14%) and apoB (-16%), and with a 27% reduction of the small and dense LDL-particles plasma levels. The oxidizability of the control LDL decreased when mixed with HDL2a or HDL3b from patients with MS, before vs. after T (-23% for HDL2a and -18% for HDL3b) associated with a significant decrease in the content of TG in HDL3b (-12%) and HDL3c (-15%). The transference of TG to HDL normalized after T in the MS group.

Conclusions: In patients with MS, T early reduces TG concentration influencing the LDL and HDL functionality by changing their molecular composition rather than their concentration, emphasizing the early benefits of exercise and highlighting the importance of evaluating lipoproteins composition and functional aspects besides their plasma levels.