Abstract

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Amelioration of Lipid Abnormalities by α-Lipoic acid Through Antioxidative and Anti-Inflammatory Effects.

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OBJECTIVE: Recent data have revealed that oxidative products and inflammatory mediators are increased in the insulin-resistant states of obesity and type 2 diabetes mellitus (T2DM). Obese patients with impaired glucose tolerance (IGT) are at high risk for developing T2DM and have high incidence of dyslipidemia. α-Lipoic acid (ALA) is a potent antioxidant with insulin sensitizing activity. However, it is not clear whether ALA is effective on lipid parameters in humans.

METHODS: This study has investigated 22 obese subjects with IGT (obese-IGT), 13 of whom underwent 2-week ALA treatment, 600 mg intravenously once daily. Before and after the treatment, euglycemic-hyperinsulinemic clamps were used to measure insulin sensitivity. Meanwhile, plasma lipids, oxidative products, and chronic inflammatory markers were measured.

RESULTS: After treatment of ALA in obese-IGT patients, insulin sensitivity was improved, insulin sensitivity index (ISI) impressively enhanced by 41%. Plasma levels of free fatty acids (FFAs), triglyceride (TG), total cholesterol (T-Chol), low density lipoprotein-cholesterol (LDL-Chol), small dense LDL-Chol (sd-LDL), oxidized LDL-Chol (ox-LDL-Chol), very low density lipoprotein-cholesterol (VLDL-Chol) were all significantly decreased ($P < 0.01$). At the same time, both plasma oxidative products (malondialdehyde (MDA), 8-iso-prostaglandin) and inflammatory markers (tumor necrosis factor-α (TNF-α), interleukin-6 (IL-6)) were remarkably decreased ($P < 0.01$), while adiponectin was increased ($P < 0.01$). There are significant negative correlations between ISI and plasma FFAs, sd-LDL-Chol, ox-LDL-Chol, MDA, 8-iso-prostaglandin, TNF-α, and IL-6, and positive correlations with HDL-Chol and adiponectin in obese-IGT patients.

CONCLUSIONS: The results indicate that short-term treatment with ALA can improve insulin sensitivity and plasma lipid profile possibly through amelioration of oxidative stress and chronic inflammatory reaction in obese patients with IGT.

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