Effects of β-carotene, vitamin C and E on antioxidant status in hyperlipidemic smokers

Jane C. -J. Chao, Chiung-Hui Huang, Shu-Ju Wu, Suh Ching Yang, Nen-Chung Chang, Ming-Jer Shieh and Ping Nan Lo

Chao;JC-J;Huang;C-H;Wu;S-J;Yang;SC;Chang;N-C;Shieh;M-J;and Lo PN

Abstract

Smoking can accelerate the consumption of the stored antioxidant vitamins and increase the oxidative stress in the hyperlipidemic patients. The study investigated the effects of combined β-carotene, vitamin C, and vitamin E on plasma antioxidant levels, erythrocyte antioxidative enzyme activities, and LDL lipid peroxides. Male hyperlipidemic smokers (35–78 years old) were randomly divided into two antioxidant supplemented groups: intervention 1 (I1, N = 22) (15 mg β-carotene/day, 500 mg vitamin C/day, and 400 mg α-tocopherol equivalent/day) and intervention 2 (I2, N = 20) (30 mg β-carotene/day, 1000 mg vitamin C/day, and 800 mg α-tocopherol equivalent/day). After 6-week supplementation, plasma β-carotene, vitamin C, vitamin E, and erythrocyte glutathione levels increased significantly by 200%, 98%, 129%, and 39%, respectively, in the I1 group, and by 209%, 216%, 197%, and 32%, respectively, in the I2 group. Plasma Fe+2 concentrations and Fe+2/Fe+3 decreased significantly in both groups. Except erythrocyte glutathione peroxidase activity in the I1 group, erythrocyte catalase, glutathione peroxidase, and superoxide dismutase activities increased significantly in both groups. Lipid peroxides in LDL decreased significantly by 56% and 72% in the I1 and I2 groups, respectively. However, the levels of plasma iron, erythrocyte glutathione, and LDL lipid peroxides, and the activities of erythrocyte antioxidative enzymes did not differ between two groups. In conclusion, combined antioxidant supplements increased plasma antioxidant levels and antioxidative enzyme activities, and lowered LDL lipid peroxides in male hyperlipidemic smokers. Higher dosage of the supplements did not have an additive effect.