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Lipid peroxidation and endothelial function in healthy adults and patients with coronary artery disease

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Endothelial dysfunction, increased vascular oxidative stress and lipid peroxidation have been the risk factors in coronary artery disease (CAD). The purpose of the study was to investigate the relationship between the vasoreactivity of brachial artery and the degree of in vivo lipid peroxidation in healthy adults and patients with CAD. Ninety-one subjects were enrolled voluntarily in the cross-sectional study and classified into healthy adults (n=48) and CAD patients (n=43). Urinary excretion of the 8-epi-prostaglandin $F_{2\alpha}$ (PGF $_{2\alpha}$) (346.2 ± 44.0 pg/mg creatinine vs. 222.5 ± 25.3 , $P < 0.05$) was significantly greater in CAD patients than in healthy adults. Also, plasma C-reactive protein (CRP) levels (0.5 ± 0.10 mg/L vs. 2.0 ± 0.60 , $P < 0.05$) were significantly higher in CAD patients than in healthy adults. There were no significant differences in flow-mediated dilation (FMD), which indicates endothelium-dependent vasodilation, between healthy adults and CAD patients (6.37 ± 0.49 % vs. 6.22 ± 0.79). CAD patients showed a tendency towards lower nitroglycerin-mediated dilation (NMD), which indicated endothelium-independent vasodilation, compared to healthy adults (11.0 ± 0.81 % vs. 8.74 ± 0.81 , $P < 0.1$). Urinary excretion of the 8-epi-PGF $_{2\alpha}$ was inversely related to FMD ($r = -0.237$, $P < 0.05$) and the index of endothelial function ($r = -0.203$, $P < 0.1$). In addition, no significant difference in plasma total homocysteine (tHcy) concentration was detected between healthy adults and CAD patients. However, a negative correlation between FMD and tHcy was observed ($r = -0.309$, $P < 0.05$). Furthermore, serum concentration of α -tocopherol was inversely related to urinary excretion of the 8-epi-PGF $_{2\alpha}$ ($r = 0.320$, $P < 0.1$) and positively related to the endothelial function index ($r = -0.292$, $P < 0.05$). In conclusion, the accumulation of lipid peroxidation products such as 8-epi-PGF $_{2\alpha}$ seems to be associated with an impaired vasodilation. Furthermore, a relationship between the levels of α -tocopherol and endothelial vasodilatory function suggested a beneficial role for this potent lipid-soluble antioxidant.