FAVORABLE EFFECTS OF L-ARGININE ON ARTERIAL FUNCTION, INFLAMMATORY AND FIBRINOLYTIC PROCESS IN SMOKERS

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Background: Smoking is associated with impaired vascular function and increased inflammatory status. We investigated the effect of l-arginine on vascular function, inflammatory process and fibrinolytic system in smokers.

Methods: We studied the effect of a 3-day oral administration of l-arginine in 12 healthy smokers (24±3yrs) on 3 occasions (day0:baseline,day1,day3). The study was carried out on two separate arms, one with l-arginine (3x7gr/d) and one with placebo (randomized,placebo-controlled,double-blind,double-over design).Measurements were carried out before and 20 minutes after cigarette smoking. Endothelial function was evaluated by flow-mediated dilatation (FMD) of the brachial artery. Carotid-femoral pulse wave velocity (PWV) was measured as an index of aortic stiffness and augmentation index (AIx) as a measure of arterial wave reflections. Circulating levels of soluble intercellular cells adhesion molecule (s-ICAM-1) and tissue plasminogen activator (tPA) were measured by ELISA.

Results: Compared to placebo, l-arginine improved FMD(from 5.35±0.66% at day0 to 7.56±0.85%,p<0.01 at day1 and 7.19±0.96,p<0.05 at day3). l-arginine induced a progressive decrease of PWV(from 5.02±0.19 m/s at day0 to 4.72±0.19 m/s at day1 and 4.62±0.14 m/s at day 3,both p<0.01) and AIx(from 7.36±3.36% at day0 to 1.36±3.36% at day1 and -2.13±3.1% at day 3,both p<0.01). In day 1 and day 3, l-arginine blunted the smoking-induced increase in AIx and PWV in no statistical significant values. Importantly, l-arginine reduced serum levels of sICAM-1 at days 1 and 3(from 235.5ng/ml at day0 to 217 at day 1 and 219 at day 3,p<0.05 for both). Acute smoking induced a significant reduction of tPA in the placebo group(from 6.18±0.71ng/ml to 4.52±0.4 at day0,from 5.8±0.7 to 4.1±0.3 at day1,from 6.5±0.7 to 4.7±0.3 at day3,p<0.05 for all),while l-arginine prevented this effect(p=NS for all).

Conclusion: Short-term administration of l-arginine improves endothelial function and vascular elastic properties of the arterial tree in healthy smokers, an effect which is accompanied by a reduction of inflammatory process and improvement of their response to smoking-induced alterations of fibrinolytic profile.