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The Effects of L-Arginine (the Precursor of Nitric Oxide) and L-NAME (Nitric Oxide Synthase Inhibitor) on Coronary Angiogenesis in Normal Rats

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Abstract

Background: Nitric oxide (NO) has beneficial effects on cardiovascular system including improvement of angiogenesis. The aim of this study was to evaluate the effects of L-arginine (the precursor of NO) and L-NG-nitroarginine methyl ester (L-NAME) (NO synthase inhibitor) on serum vascular endothelial growth factor (VEGF) and coronary angiogenesis in normal rats.

Methods: In this study, 18 male rats were randomly divided into 3 groups. Groups 1 and 2 received intraperitoneal L-NAME (10 mg/kg/day) and intraperitoneal L-arginine (50 mg/kg/day), respectively. Group 3 (control) received normal saline with the same volume. After 3 weeks, blood samples were taken for measuring serum VEGF and NO concentrations. Coronary angiogenesis was also evaluated using immunohistochemistry method.

Findings: Serum NO concentration in the control group was 6.45 ± 0.44 µmol/l. Serum NO concentrations were increased by administration of L-arginine (7.90 ± 0.75 vs. 6.45 ± 0.44 µmol/l) and decreased by administration of L-NAME (4.86 ± 0.40 vs. 6.45 ± 0.44 µmol/l). L-arginine significantly increased serum VEGF concentration (353.01 ± 7.03 vs. 100.50 ± 6.61 pg/ml; $P < 0.05$). L-arginine and L-NAME could not change capillary density in heart tissue.

Conclusion: Although L-arginine could change some serum angiogenic factors, neither L-arginine nor L-NAME could alter coronary angiogenesis in normal rats.

Keywords: L-arginine, L-NAME, Nitric oxide, Vascular endothelial growth factor, Angiogenesis

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