Abstract

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Acute and chronic effects of vitamin C on endothelial fibrinolytic capacity in overweight and obese adult humans.

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OBJECTIVE AND METHODS: We determined the effects of acute intra-arterial vitamin C administration and chronic oral vitamin C supplementation on the capacity of the endothelium to release t-PA in overweight and obese adults. Net endothelial t-PA release was determined in vivo in response to intra-brachial infusions of bradykinin and sodium nitroprusside in thirty-three sedentary adults: 10 normal weight (BMI: 23.4 +/- 0.5 kg m-2; 7M/3F); and 23 overweight/obese (BMI: 31.2 +/- 0.8 kg m-2; 15M/8F). In 10 normal weight and 8 overweight/obese adults the dose-response curves to bradykinin and sodium nitroprusside were repeated with a coinfusion of the antioxidant vitamin C (24 mg min-1). Seventeen of the 23 overweight/obese adults completed a 3-month chronic oral vitamin C (500 mg day-1) supplementation intervention.

RESULTS: Intra-arterial administration of vitamin C significantly potentiated t-PA release in overweight/obese adults. Net release of t-PA was ~95% higher ($P < 0.01$) after (from -0.9 +/- 1.1 to 94.6 +/- 16.2 ng (100 mL tissue-1) min-1) compared with before (from -0.8 +/- 0.8 to 49.9 +/- 7.7 ng (100 mL tissue-1) min-1) vitamin C administration. Daily vitamin C supplementation significantly increased t-PA release in overweight/obese adults (from 0.2 +/- 0.9 to 48.2 +/- 6.5 ng (100 mL tissue-1) min-1) before supplementation vs. 0.3 +/- 0.5 to 66.3 +/- 8.7 ng (100 mL tissue-1) min-1) after supplementation).

CONCLUSION: These results indicate that the antioxidant vitamin C favorably affects the capacity of the endothelium to release t-PA in overweight/obese adults. Daily vitamin C supplementation represents an effective lifestyle intervention strategy for improving endothelial fibrinolytic regulation in this at-risk population.

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