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MEETING ABSTRACT

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Hemodynamic effects of free fatty acids

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Background: In healthy subjects infusion of free fatty acids (FFA) stimulates sympathetic nervous system activity, impairs endothelium-dependent vasodilation and increases limb blood flow. The net effects on the cardiovascular system are inconsistent, with some but not all studies reporting increased pressor responses. The underlying mechanism (cardiac vs. vascular) is not well studied. Thus, the aim of the present study was to assess the combined effect of FFA infusion and stress on pressor responses employing two stressors eliciting either a cardiac (Stroop test) or vascular (cold face test) dominated pressor response.

Methods: Twenty healthy non-smoking subjects (10 women, 10 men) participated in this randomized, double-blind, cross-over study, involving 2 study days with a washout period of at least 7 days between the study days. Each subject received an intravenous lipid emulsion with heparin or saline on alternate study days. After a 15-minute baseline period the two stress tasks were performed. Thereafter, the intralipid/saline infusion was started, lasting until the end of the experiment. Stress tasks were repeated after 180 minutes of infusion. Blood pressure, heart rate, stroke volume, cardiac output (CO) and total peripheral resistance (TPR) were measured. FFA and stress effects were tested by a series of 2 (placebo/FFA) × 2 (base vs. task) ANOVAs.

Results: The intralipid infusion had no influence on mean arterial pressure levels but significantly altered the underlying pattern. Compared to saline, absolute levels of cardiac output increased ($F=9.98$; $p<0.005$) and total peripheral resistance ($F=4.46$; $p<0.05$) decreased. Although the Stroop test and cold face test elicited the expected myocardial (significant increase in CO and decrease in TPR) and vascular (significant decrease in CO and increase in TPR) pattern of responses, respectively (all $F>4.38$; $p<0.05$), these responses were uninfluenced by the intralipid infusion.

Discussion: The results suggest that in young healthy subjects acute increases in FFA primarily influence the underlying mechanism of the pressor response by decreasing TPR and increasing CO but neither magnitude nor pattern of the stress response itself, irrespective of the type of stressor applied.

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