Acute cholesterol responses to mental stress and change in posture

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Abstract

Background: Serum lipid levels vary widely within individuals, but the causes of these fluctuations are poorly understood. One area of research concerns elevations in cholesterol concentration in response to emotional stress. In a laboratory-based experiment, we compared the effects of acute mental stress and postural change (standing) on serum cholesterol concentration. In addition, plasma volume was indirectly monitored to determine whether cholesterol changes with mental stress, if present, were a function of hemoconcentration.

Methods: Twenty-six men attended two laboratory sessions, each consisting of baseline (30 minutes), task (20 minutes), and recovery (30 minutes) periods. Subjects rested in the supine position during the baseline and recovery periods. During the task period of one session, subjects performed a mental task (Stroop test and mental arithmetic); during the other session, the subjects stood for the task period.

Results: Both mental stress and standing elicited significant elevations in heart rate, blood pressure, and plasma catecholamine concentrations, relative to the baseline and recovery periods. Both the mental and orthostatic tasks also significantly increased serum cholesterol concentration (by 0.10 and 0.57 mmol/L [3.7 and 21.9 mg/dL], respectively), as well as hemoglobin level and hematocrit. Cholesterol elevations with standing were reversible, while those resulting from mental stress persisted through the recovery period. When values were corrected for concomitant hemoconcentration, no net change in serum cholesterol level occurred during either task.

Conclusions: Acute mental stress can produce rapid elevations in serum cholesterol concentration. It can also increase hemoglobin concentration and hematocrit (ie, reduce plasma volume). Therefore, increases in serum cholesterol level after acute mental stress are analogous to those with standing and may reflect hemoconcentration rather than altered lipoprotein metabolism.

Reference:

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