ASCORBIC ACID SUPPLEMENTATION LOWERS LOW DENSITY LIPOPROTEIN-CHOLESTEROL IN HEALTHY YOUNG WOMEN

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Ascorbic acid (AA) status is negatively associated with the risk of heart disease. Observational studies suggest that the protective effect of AA is multifactorial in nature and it is thought to involve a reduction in plasma cholesterol concentration as well as the redistribution of cholesterol within plasma lipoproteins, resulting in a less atherogenic lipoprotein profile (Hemilä 1992). The aim of this study was to determine the effect of AA supplementation on plasma lipids and lipoproteins in healthy, young women.

Ten women (age 22.1±1.7 years, weight 60.9±10.3 kg, BMI 21.6±2.9 kg/m^2; mean±SD) were recruited to participate in a randomised double-blind cross-over trial and supplemented with 1000 mg AA daily for four weeks, followed by placebo, and vice versa. Plasma AA concentrations were higher after both two weeks ($P<0.0001$) and four weeks ($P<0.001$) of supplementation compared with baseline. Plasma AA levels were saturated by two weeks as supplementation for a further two weeks did not result in any additional increase. In those subjects receiving AA supplements in the first half of the trial followed by placebo, plasma AA concentrations did not return to baseline levels. The data were therefore analysed as an unrandomised trial using paired t-tests. Plasma concentrations of low density lipoprotein cholesterol (LDL-C) were found to be 15.7% lower at four weeks of supplementation compared with baseline (2.81±1.10 and 2.37±0.64 mmol/L respectively, $P<0.05$; Figure) and the magnitude of the reduction in LDL-C was inversely correlated with the starting LDL-C level ($r^2=0.75$, $P<0.01$). High density lipoprotein cholesterol (HDL-C) concentrations were unchanged throughout the study. Significant decreases were observed in the total cholesterol to HDL-C ratio at two weeks (corresponding to the maximal increase in plasma AA concentrations) and the LDL-C to HDL-C ratio at both two and four weeks of supplementation ($P<0.05$). There was a 7.7% increase in HDL-C per 30 μmol/L increment in plasma AA concentrations ($P<0.05$).

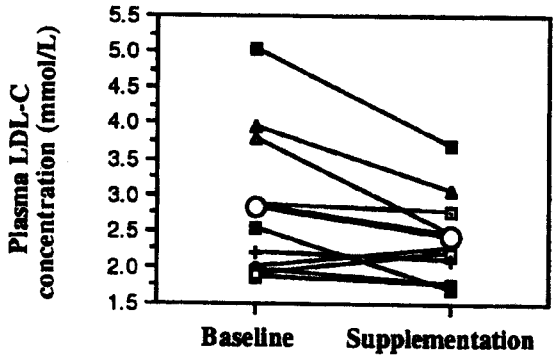

Figure. Individual changes in plasma LDL-C concentration (mmol/L) from baseline to 4 weeks' supplementation. Mean change shown as large open circle (O).

Our findings consolidate those from epidemiological studies and suggest that AA supplements may favourably alter the lipoprotein profile in young women by lowering plasma LDL-C concentrations . In light of the carry-over effect observed in this study, the incorporation of a wash-out period into the study design is recommended for further studies of this nature.

HEMILA, H. (1992). Crit. Rev. Food Sci. Nutr. 32: 33.

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