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Abstract

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Plasma fatty acid composition and incidence of coronary heart disease in middle aged adults: the Atherosclerosis Risk in Communities (ARIC) Study.

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Author information

Abstract

BACKGROUND AND AIM: To prospectively investigate the relation of plasma cholesterol ester (CE) and phospholipid (PL) fatty acid (FA) composition with incidence of coronary heart disease (CHD).

METHODS AND RESULTS: 3,591 white participants in the Minneapolis field center of the Atherosclerosis Risk in Communities Study, aged 45-64 years, were studied. Plasma FA composition of CEs and PLs was quantified using gas-liquid chromatography and expressed as percentage of total FAs. Incident CHD was identified during 10.7 years of follow-up. In both CE and PL fractions, the proportions of stearic (18:0) acid, dihomo-gamma-linolenic (20:3n6) acid and total saturated fatty acids (SFAs) were significantly higher while arachidonic (20:4n6) acid and total polyunsaturated fatty acids (PUFAs) were significantly lower among participants who developed incident CHD (n = 282). After adjusting for age, gender, smoking, alcohol drinking, sports activity, and non-FA dietary factors, the incidence of CHD was significantly and positively associated with the proportion of dihomo-gamma-linolenic acid but inversely associated with arachidonic acid. The multiply-adjusted rate ratios (RRs) of CHD incidence for the highest versus the lowest quintile were 1.31 in CE and 1.44 in PL for dihomo-gamma-linolenic acid (p for trend: 0.05 and 0.017, respectively), 0.59 in CE and 0.65 in PL for arachidonic acid (p: 0.016 and 0.024, respectively). Also significantly and positively associated with incident CHD were PL stearic acid and CE linolenic (18:3n3) acid. Only a borderline significant positive association was observed for total SFAs in CE (multivariate RRs across quintiles: 1.00, 1.15, 1.40, 1.62, 1.32; p = 0.07). Total PUFAs or monounsaturated FA were not independently associated with CHD.

CONCLUSIONS: Our study found a weak positive association of SFAs with incident CHD. Our findings also confirm that FA metabolism in the body, such as the activity of delta-5 desaturase, which converts dihomo-gamma-linolenic acid to arachidonic acid, may affect the development of CHD.

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