

Impaired HDL response to fat in men with coronary artery disease

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A low HDL cholesterol is a frequent finding in patients with coronary artery disease (CAD) and normal LDL cholesterol. We hypothesised that these patients do not have the normal adaptive response to a high fat diet and fail to show an increase in HDL cholesterol while LDL cholesterol increases as expected.

Twenty one men with established coronary artery disease (CAD) and normal cholesterol (5.3 mmol/L) were matched for age (53 years), body mass index (26) and total cholesterol (TC) with 26 men with no personal or family history of coronary artery disease. The men with CAD had a low HDL cholesterol (0.84 vs 0.97 mmol/L, $P < 0.05$) and a high triglyceride (1.95 vs 1.50 mmol/L, $P < 0.05$). After a two week baseline low fat (25% of energy) period they were given a daily low fat high-carbohydrate drink (2.6 MJ) for three weeks.

At the end of this period a monounsaturated fat rich drink (from canola oil) equal in energy and protein level to the high carbohydrate drink was given for a further three weeks. Three blood samples were taken at the end of each period and an intravenous glucose tolerance test was performed at the end of the low fat and high fat periods. At the end of the high carbohydrate period plasma triglyceride (TG) rose and HDL fell significantly compared with baseline while at the end of the high fat period, TG and LDL cholesterol fell and HDL cholesterol rose significantly compared with the low fat period. The rise in HDL was greater ($P < 0.01$) in the normal group while the fall in TG was greater in the CAD group ($P < 0.05$). The change in LDL cholesterol was similar.

The men with CAD also had a greater rise in plasma insulin at 4, 6, 8 and 16 min (total 216 mU/ml vs 143 mU/ml, $P = 0.01$) on both diets. The peak glucose and the rate of fall of plasma glucose was the same for both groups on either diet.

Group/Diet	TC	TG	HDL	LDL
CAD-low fat	5.44 ± 0.74	2.57 ± 1.14	0.79 ± 0.20	3.47 ± 0.84
CAD-high fat	5.05 ± 0.73	1.78 ± 0.64	0.89 ± 0.24	3.27 ± 0.87
Normal-low fat	5.19 ± 0.89	1.89 ± 1.06	0.88 ± 0.18	3.47 ± 1.00
Normal-high fat	4.93 ± 0.87	1.44 ± 0.62	1.05 ± 0.25	3.27 ± 0.80

data in mmol/L

Men with CAD and a low HDL cholesterol and high plasma triglyceride appear to be insulin resistant. Fasting insulin and glucose levels were no different from those of the control group. Thus men with CAD and low HDL cholesterol have an impaired HDL response to dietary fat, despite significant suppression of TG. A high monounsaturated fat diet also provides a better lipoprotein profile than a low fat diet in both groups and could be recommended for men with coronary artery disease and low HDL cholesterol and high plasma triglyceride.