

Case Report

Hypercholesterolaemia in a Vegan

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A vegan is a person who abstains from all food of animal origin.

It is generally accepted that a vegetarian diet and especially a vegan diet is associated with a low serum cholesterol.^{1,2,3} When vegans are surveyed they have a significantly lower intake of total energy and especially energy from fat⁴ and their mean serum total cholesterol is also lower than expected values for the normal population.⁵ We present a patient who was a strict vegan but had a high serum cholesterol. No identifiable evidence was found for either familial or secondary hypercholesterolaemia.

Case Report

A 58 year old man was admitted for coronary artery bypass grafting for severe triple-vessel disease. He had been a vegan for fourteen years, and since 1980 had rigidly adhered to a diet of black tea and coffee, dry bread and vegetables. He gave a history of increasingly severe angina over two years reaching New York Heart Association Grade 4 in the immediate pre-operative period. There had been several admissions to hospital with unstable angina.

With regard to risk factors, there was no history of hypertension or diabetes mellitus, and he had stopped smoking twenty years previously. There was however a strong family history of ischaemic heart disease, but no definitive evidence of familial hypercholesterolaemia. The serum cholesterol of all the patient's siblings was measured, and ranged between 5.7-6.9 mmol/l.

Thyroid function tests prior to admission were normal as were full blood picture, renal profile, total protein and albumin in the ward.

His medications were isosorbide mononitrate LA 50mg mane, atenolol 25mg mane, glyceryl trinitrate 3mg tid, diltiazem 120mg bd, chlorpheniramine 8mg nocte, bismuthate 240mg bd, omeprazole 20mg bd and cyanocobalamin intramuscularly every month.

A random serum cholesterol on admission was 8.39mmol/l.

On examination the patient was thin, his height was 173cm and his weight was 64.7kg. No corneal arcus or xanthoma was detectable; his blood pressure was 110/60mmHg. The remaining full clinical examination revealed no abnormality and his ECG was normal.

Cardiac catheterization in December 1993 had shown severe triple-vessel disease with good left ventricular function.

Pre-operatively his fasting lipids were measured. They were:

Cholesterol	7.9 mmol/l
HDL Cholesterol	1.03mmol/l
LDL Cholesterol	5.21mmol/l
Triglyceride	3.14mmol/l

Successful coronary artery bypass grafting was performed in November 1994 and he made an uneventful post-operative recovery.

DISCUSSION

The vast majority of publications on vegetarian diets relate them to lowering serum cholesterol. Hostmark et al.¹ quoted a fall from 6.61mmol/l to 4.83mmol/l in total serum cholesterol on a three-week vegetarian diet. Vuoristo et al.² and Krajcovicova-Kudlackova et al.³ found vegetarians as a group had lower serum total cholesterol and LDL cholesterol.

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A study of vegans of the Seventh-Day Adventist faith showed their mean cholesterol level at 3.4mmol/l.⁴ Their triglyceride and (low density lipoprotein) cholesterol were also lower when compared to the normal population. The Adventist Health Study⁵ examined their diet in more detail. It was found that frequent nut consumption [more than four times a week] protected against both fatal and non-fatal myocardial infarcts.

Marniemi et al.⁶ recently studied the effects of a vegetarian diet over one year. They found that serum cholesterol decreased rapidly at first but at six and twelve month intervals was no longer significantly different from pre-study cholesterol.

The above patient's diet would be high in plant sterols. In some cases this may lead to a falsely high serum cholesterol level but the assay used in our case was quite specific and was able to differentiate between sterols and cholesterol. Recent evidence suggests a close relationship between serum sterol level and cholesterol absorptions.⁷

After collecting the fasting lipid levels of all the patient's siblings there was no evidence for either familial hypercholesterolaemia or triglyceridaemia. It is well noted however that individual responses to changes in dietary cholesterol are very variable. Factors such as efficiency of absorption, rates of cholesterol biosynthesis, LDL-receptor activity, secretion of cholesterol into bile and hepatic conversion of cholesterol into bile acids all account for this variability.

The opposite extreme to our patient is an 88 year old man who ate 25 eggs a day and had a normal serum cholesterol.⁸

In our case the high serum cholesterol could be explained either by the vegan diet failing to sustain an effect after fourteen years or a cholesterol metabolic pathway specific to this patient.

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