

HYPERLIPOPROTEINAEMIA AND DIETARY FAT MODIFICATION IN HAEMODIALYSIS AND RENAL TRANSPLANT PATIENTS

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A group of patients in a haemodialysis and renal transplant programme have been assessed for the frequency of lipid abnormalities. Hypercholesterolaemia was not a significant problem amongst haemodialysis patients, but mild hypercholesterolaemia was common amongst transplant patients. Mild hypertriglyceridaemia was a feature of both haemodialysis and transplant patients. Irrespective of initial lipid values, each patient was advised to undertake dietary fat modification for a period of eight months. There was a small significant lowering of plasma triglyceride values in the haemodialysis group. It is concluded that major lipid abnormalities are not a feature of this group and that the return for dietary fat modification is small, although occasional individual patients may warrant hypolipidaemic therapy.

CONCERN about excessive cardiovascular mortality in patients with renal disease^{1 2} has led renal units to evaluate risk factors for ischaemic heart disease in more detail. In particular, elevated plasma cholesterol and triglyceride values have been singled out as potentially important risk factors.^{3 4 5 6 7 8 9} With this background, we took the view that a group of patients in a haemodialysis and renal transplant programme, who had not previously received formal dietary instruction, should receive this advice. The advice was given irrespective of initial lipid values and was continued for several months.

Added stimulus for dietary fat modification has been the lack of satisfactory drug therapy for hyperlipidaemia in association with renal disease. Clofibrate can induce myopathy in renal failure,^{10 11 12 13} although it does reverse the lipoprotein lipase deficiency.¹⁴ Bile acid sequestering agents such as cholestyramine and colestipol tend to exacerbate hypertriglyceridaemia by stimulating lipoprotein synthesis.¹⁵ Nicotinic acid can increase hyperuricaemia.¹⁶

METHODS

Haemodialysis and renal transplant patients in the Canberra area were asked whether they would agree to modification of their dietary fat intake over a period of several months in an effort to lower their plasma lipid levels and reduce their risk for ischaemic heart disease. Eight haemodialysis and 11 renal transplant patients (receiving immunosuppressive therapy with steroids and azathioprine) participated; two haemodialysis and one transplant patient did not participate. There were three male and five female haemodialysis patients; there were seven male and four female transplant patients.

Fasting plasma triglyceride¹⁷ and cholesterol¹⁸ levels were measured on two occasions before the dietary advice was given. The mean of

the two readings was taken as the pretreatment value for each parameter. Plasma triglyceride levels above 1.7 mmol/litre and plasma cholesterol levels above 6.2 mmol/litre were regarded as abnormal.

Dietary advice was given monthly. The advice was to decrease fat intake, increase polyunsaturated fat intake and decrease cholesterol intake. Advantage was taken of a commercially available egg mix with the cholesterol-rich yolk removed and replaced by a polyunsaturated fat (Sunrise Egg[®], a product of the New South Wales Egg Board). This allowed the continued use of high-grade egg protein.

RESULTS

Before receiving dietary advice, haemodialysis patients as a group were not significantly hypercholesterolaemic, although two of eight patients did have hypercholesterolaemia (Table 1). Mild hypercholesterolaemia was more commonly seen amongst the renal transplant group (Table 1). Although one transplant patient had a plasma cholesterol level of 11.1 mmol/litre, the next highest value in this group was 8.3 mmol/litre. Mild hypertriglyceridaemia was seen in both the haemodialysis and the transplant groups (Table 1).

TABLE 1
Plasma Lipid Levels in Haemodialysis and Renal Transplant Patients Before and After Eight Months of Dietary Fat Modification

	Plasma Levels (mmol/litre)			
	Haemodialysis Patients		Transplant Patients	
	Before Diet	After Diet	Before Diet	After Diet
<i>Cholesterol</i>				
Mean ± SEM ..	5.6 ± 0.5	5.4 ± 0.5 ^{ns}	7.1 ± 0.5	7.1 ± 0.3 ^{ns}
Range ..	4.3 to 8.1	4.1 to 8.0	5.0 to 11.1	6.1 to 8.4
Frequency of abnormality ..	2/8	2/8	8/11	9/11
<i>Triglycerides</i>				
Mean ± SEM ..	2.3 ± 0.4	1.8 ± 0.1 ^s	2.4 ± 0.6	2.0 ± 0.3 ^{ns}
Range ..	1.2 to 3.8	1.3 to 2.1	0.7 to 7.3	0.9 to 3.9
Frequency of abnormality ..	5/7	5/7	6/11	7/10

Significance of difference between lipid values before and after dietary modification has been assessed by a paired *t* test ($ns = P > 0.05$; $s = P < 0.001$).

For one of the haemodialysis patients and one of the transplant patients after the diet, no triglyceride values are included as there was doubt about the fasting state.

The only parameter which showed a significant response to dietary modification was the plasma triglyceride level in the haemodialysis group. Here, however, the overall reduction was only 0.5 mmol/litre. As a group, the transplant patients did not exhibit a fall in their cholesterol values, although in the patient with hypercholesterolaemia (plasma level of 11.1 mmol/litre) the value fell to 8.4 mmol/litre.

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DISCUSSION

The preponderance of hypertriglyceridaemia as the lipid abnormality in haemodialysis patients is in agreement with the results of other workers.⁹ The extent to which the small reduction in plasma triglyceride levels for the group may confer an advantage with respect to risk from ischaemic heart disease will presumably depend on the interaction with other risk factors.¹⁹

The combination of hypertriglyceridaemia and hypercholesterolaemia seen in the transplant group of patients would be expected to confer a greater risk for ischaemic heart disease than the hypertriglyceridaemia of the haemodialysis patient group. Yet dietary fat modification did not make an impact on the group. Selected patients with especially high lipid levels or associated coronary risk factors may still benefit from such advice.²⁰⁻²¹ It is interesting that, in an Italian study of transplant patients in which a low-calorie, low-carbohydrate diet was prescribed, a significant reduction in plasma triglyceride level was seen.²² However, prediet triglyceride values were higher than in our study.

An important consideration in renal patients is the fact that they have already had a significant interference with lifestyle and, often, diet. As far as possible, we tried to make the new diet interesting and appetizing. However, we cannot say to what extent a lack of change in plasma lipid levels was due to non-adherence to our dietary recommendations.

Our impression is that, in most haemodialysis and renal transplant patients, lipid abnormalities are not major determinants of coronary disease. Perhaps, along with coronary risk factors such as hypertension, smoking, vascular calcification, impaired glucose tolerance and reduced high-density lipoprotein levels⁹⁻²³ seen in these patients, they assume more importance.

A group of renal patients not assessed in this study—the group with the nephrotic syndrome—is prone to a variety of lipid disorders⁷ and ischaemic heart disease.¹ Further information on dietary and drug treatment of hyperlipidaemia in the nephrotic syndrome is required.

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