Letters to the editor

The effect of fish-oil on the remission of Type 1 (insulin-dependent) diabetes in newly diagnosed patients

Dear Sir,

Type 1 (insulin-dependent) diabetes is thought to be the result of a chronic autoimmune process [1, 2] which eventually leads to B-cell destruction. The onset of the disease is followed in about 11% of patients by a transitory remission phase, which may be related to preservation of residual insulin secretory capacity [3]. A diet rich in fish oil has anti-inflammatory properties as indicated by the suppression of autoimmunity in MRL-lpr mice [4]. It is thus possible that a diet rich in eicosapentaenoic acid (EPA) could modulate the immune response and prevent further B-cell damage in newly-diagnosed Type 1 diabetes mellitus.

In a pilot study, we have investigated the effect of dietary supplementation with fish-oil on remission of newly-diagnosed Type 1 diabetes mellitus. Remission was defined as a blood glucose value less than 7.8 mmol/l fasting and 11.1 mmol/l post-prandially (2 h after breakfast), and a normal HbA_{1c} (4.9–7.5%) level in the absence of insulin treatment.

Eight (5 male, 3 female) newly-diagnosed ketosis prone Type 1 diabetic patients, aged between 14 and 38 years (mean 25 years), were recruited within 2 weeks of the onset of diabetes. Following baseline assessment, patients were randomly assigned to a standard diabetic diet supplemented either with 20 g MaxEPA (Markfleet Refining Company, Hull, UK) daily, in the form of 20 ml oil, equivalent to 3.6 g EPA, 2.4 g docosahexaenoic acid and 180 kcal (4 patients) or with an isocaloric amount of olive oil (4 patients). All patients were treated with a mixture of soluble and intermediate acting insulins twice daily. Further assessments were made at 1 month and then every 3 months up to 9 months. Diabetic control was assessed by home blood glucose profile and HbA_{1c} levels. Dietary compliance was checked by a dietician at each visit. Heparinised blood was taken for isolation of monocytes, lymphocytes and neutrophils as previously described [5]. Lymphocytes were used for measurement of HLA-DR, interleukin 2 (IL-2), islet cell antibodies (ICA) and complement-fixing islet cell antibodies (CF-ICA). Monocytes and neutrophils were used for analysis of membrane phospholipids [5].

Diabetic control improved similarly in both groups after the initiation of therapy, but it was not possible to withdraw insulin in any patient (Table 1). Cholesterol levels fell by 5% and triglyceride by 22% approximately in the experimental group with similar changes were seen in the control group. Platelet counts decreased in the experimental group only by 15% over the course of the study.

Membrane phospholipid analysis of monocytes and neutrophils showed an approximately ten-fold increase in EPA from 0.35% total

fatty acid content to 3.73%, and a decrease in arachidonic acid content from 15.95% to 12.68% in the experimental group confirming incorporation and compliance. The control group showed approximately a 78% increase in EPA, with approximately a 10% decrease in arachidonic acid.

At diagnosis 5 patients (2 experimental, 3 control) were ICA positive and 4 patients (3 experimental, 1 control) were CF-ICA positive. By the end of the study 3 patients remained ICA positive (1 experimental, 3 control) and 2 remained ICA positive (1 experimental, 1 control). HLA-DR and IL-2 showed no consistent changes during treatment in either group.

Short-term dietary supplementation with MaxEPA has been reported to induce either a deterioration or no change in glycaemic control and insulin requirement in Type 1 diabetic patients of some duration [6, 7]. A hypercholesterolaemic effect has been noted by some authors [7]. In Type 2 (non-insulin-dependent) diabetic patients MaxEPA has been shown to improve insulin sensitivity by some workers [8] but other authors have found a worsening of metabolic control [6, 9]. The findings of the present study suggest that long-term supplementation of a diabetic diet with MaxEPA does not affect the autoimmune process of newly-diagnosed Type 1 diabetes mellitus.

Yours sincerely,

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References

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Table 1. Mean $\pm$ SEM blood glucose, HbA_{1c}, and daily insulin dose in 8 Type 1 (insulin-dependent) diabetic patients receiving a diet supplemented with either fish or olive oil

	Mean blood glucose (mmol/l)		HbA _{1c} %		Insulin (U/day)	
	Fish oil	Olive oil	Fish oil	Olive oil	Fish oil	Olive oil
Baseline	7.9 $\pm$ 0.9	6.7 $\pm$ 0.7	9.8 $\pm$ 1.2	10.2 $\pm$ 0.8	30 $\pm$ 6.0	39 $\pm$ 4.7
1 month	7.2 $\pm$ 1.2	6.3 $\pm$ 1.1	8.3 $\pm$ 0.6	7.9 $\pm$ 0.2	30 $\pm$ 10.2	37 $\pm$ 5.7
3 months	7.3 $\pm$ 2.0	6.1 $\pm$ 0.7	7.9 $\pm$ 1.0	7.0 $\pm$ 0.6	27 $\pm$ 9.4	37 $\pm$ 5.8
6 months	9.9 $\pm$ 2.4	5.6 $\pm$ 0.6	8.8 $\pm$ 1.5	6.4 $\pm$ 0.4	36 $\pm$ 13.3	36 $\pm$ 8.3
9 months	7.4 $\pm$ 2.9	6.5 $\pm$ 0.9	7.7 $\pm$ 0.8	7.0 $\pm$ 0.7	38 $\pm$ 14.4	39 $\pm$ 8.1

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