

ORIGINAL RESEARCH COMMUNICATION

Treatment for 2 mo with n–3 polyunsaturated fatty acids reduces adiposity and some atherogenic factors but does not improve insulin sensitivity in women with type 2 diabetes: a randomized controlled study^{1, 2, 3, 4}

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Background: Information is lacking on the potential effect of n–3 polyunsaturated fatty acids (PUFAs) on the adipose tissue of patients with type 2 diabetes.

Objective: We evaluated whether n–3 PUFAs have additional effects on adiposity, insulin sensitivity, adipose tissue function (production of adipokines and inflammatory and atherogenic factors), and gene expression in type 2 diabetes.

Design: Twenty-seven women with type 2 diabetes without hypertriglyceridemia were randomly allocated in a double-blind parallel design to 2 mo of 3 g/d of either fish oil (1.8 g n–3 PUFAs) or placebo (paraffin oil).

Results: Although body weight and energy intake measured by use of a food diary were unchanged, total fat mass ($P < 0.019$) and subcutaneous adipocyte diameter ($P < 0.0018$) were lower in the fish oil group than in the placebo group. Insulin sensitivity was not significantly different between the 2 groups (measured by homeostasis model assessment in all patients and by euglycemic-hyperinsulinemic clamp in a subgroup of 5 patients per group). By contrast, atherogenic risk factors, including plasma triacylglycerol ($P < 0.03$), the ratio of triacylglycerol to HDL cholesterol (atherogenic index, $P < 0.03$), and plasma plasminogen activator inhibitor-1 ($P < 0.01$), were lower in the fish oil group than in the placebo group. In addition, a subset of inflammation-related genes was reduced in subcutaneous adipose tissue after the fish oil, but not the placebo, treatment.

Conclusions: A moderate dose of n–3 PUFAs for 2 mo reduced adiposity and atherogenic markers without deterioration of insulin sensitivity in subjects with type 2 diabetes. Some adipose tissue inflammation-related genes were also reduced. These beneficial effects could be linked to morphologic and inflammatory changes in adipose tissue. This trial was registered at clinicaltrials.gov as NCT0037.

Key Words: Adiposity • fish oil • type 2 diabetes • women • adipocyte size • PAI-1 • atherogenic index • adipose tissue inflammation-related genes

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