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Effects of omega-3 polyunsaturated fatty acid supplementation on parameters of glycaemic control in people with type 1 diabetes: a double-blind, randomised, placebo-controlled trial

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The effect of omega-3 polyunsaturated fatty acid (n-3 PUFA) supplementation on glycaemic control in T1D remains unclear[(1)]. Additionally, the effects of n-3 PUFA on postprandial glucose control in T1D are unknown. Here, we report the effect of 6-month supplementation with a daily high-dose-bolus of n-3 PUFA on parameters of glycaemic control in people with T1D.

For this double-blind, randomized, placebo-controlled trial, individuals with T1D (n = 18; males: 14; 35 ± 15 years; BMI: 26.6 ± 5.2 kg/m^2; glycated haemoglobin (HbA_{1c}): 59 ± 13 mmol/mol^{-1} [7.5 ± 3.3%]), were randomly allocated in a 1:1 ratio to receive either 3.3 g/day of encapsulated n-3 PUFA or placebo (PLA) consisting of an encapsulated dose of 3.0 g/day corn oil for 6-months. Venous blood samples were obtained at baseline, and 6-months, to determine HbA_{1c}, fasting plasma glucose (FPG), and postprandial glucose responses (PPGR) to a standardised mixed-meal tolerance test assessed by area under the curve over a 4-hour period. Fatty acids were measured in erythrocyte membranes by gas chromatography with n-3 PUFA index (O3I) calculated as eicosapentaenoic acid plus docosahexaenoic acid. Paired-samples *t* tests were used to compare intragroup mean differences with statistical significance set at $p \leq 0.05$. Data are presented as mean ± SD.

In the n-3 PUFA group, baseline O3I increased from 4.97 ± 0.98% to 8.24 ± 1.52% after 6-months ($p < 0.001$). O3I in PLA did not change (baseline: 4.31 ± 1.22% vs. 6-months: 4.58 ± 1.59%, p = 0.256). In the n-3 PUFA group, the mean difference between baseline and 6-months for HbA_{1c} (-3.89 ± 6.05 mmol/mol^{-1}; p = 0.090), FPG (-1.04 ± 2.82 mmol/L^{-1}; p = 0.301), and PPGR (-607.03 ± 2014.63 mmol/L^{-1}/min^{-1}; p = 0.392) did not significantly differ. Similar findings were observed in the PLA group; HbA_{1c} (p = 0.208), FPG (p = 0.624), and PPGR (p = 0.966). Overall, no safety issues arose during administration of n-3 PUFA or PLA.

Supplementation with a daily high-dose-bolus of n-3 PUFA for 6-months did not modulate HbA_{1c}, FPG, or PPGR to a mixed-meal tolerance test in people with T1D. These findings do not support the use of n-3 PUFA supplementation as an adjunct therapy in the management of T1D.

1. De Caterina R, Madonna R, Bertolotto A *et al.* (2007) *Diabetes Care* **30**, 1012–1026.