Reference:

Intakes of long-chain n-3 polyunsaturated fatty acids and fish in relation to measurements of subclinical atherosclerosis


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Summary:

Various observational studies and randomized trial have indicated that higher intakes of the long-chain omega-3 fatty acids as EPA (eicosapentaenoic acid) + DHA (docosahexaenoic acid) from fish/fish oils are associated with lower risk of cardiovascular disease and associated mortality. The present cross-sectional study was conducted on a multi-ethnic group of 5488 men and women (45-84 years of age) without clinically-diagnosed cardiovascular disease. The primary objective of the study was to determine if the dietary intakes of long-chain omega-3 fatty acids (mainly as EPA + DHA) and fish may be related to measures of sub-clinical atherosclerosis. For this purpose, dietary information was assessed from self-administered food frequency questionnaires and dietary supplement forms. The intakes of omega-3 fatty acids were derived from the Minnesota Nutrition Data System software, University of Minnesota. Sub-clinical atherosclerosis was defined by various parameters, including the cCINT (common carotid intima-media thickness) as determined by B-mode ultrasound with sub-clinical atherosclerosis being defined by cCINT > 80th percentile values.

With increasing quartiles of long-chain omega-3 intakes in the population (ranging from 40 to 80 to 120 to 220 mg/day based on median intakes), there was a significant inverse relationship to the prevalence of sub-clinical atherosclerosis as measured by subjects with cCINT > 80th percentiles. Those in the quintile (highest 25% of the population) having the highest intake of long-chain omega-3 fatty acids (mean intakes of 220 mg/day) exhibited a 31% lower prevalence of sub-clinical atherosclerosis as compared to the quintile with the lowest median intake of
omega-3 (40 mg/day). Furthermore, those in the highest quintile of non-fried fish intake (broiled, steamed, baked or raw fish) with median servings of 2.0 per week, exhibited a 20% lower prevalence of sub-clinical atherosclerosis as compared to those in the lowest quintile of fish intake (essentially no non-fried fish servings/week). In addition, the authors reported significantly lower levels of fasting blood triglyceride levels (by 9% overall for those with the highest intakes of long-chain omega-3 fatty acids as compared to those in the lowest quintile) and 9% lower fasting triglyceride levels in the case of those with the highest intakes of non-fried fish per week. In addition, those in the highest quintiles for long-chain omega-3 intakes and non-fried fish intakes (as compared to the lowest quintile) exhibited significantly higher median levels of circulating HDL-cholesterol levels (approximately 2% overall). The authors concluded that their study indicated that higher intakes of long-chain omega-3 fatty acids or non-fried fish are both associated with a lower prevalence of sub-clinical atherosclerosis as classified by cCINT. Since such correlations were not observed with fried fish intakes (no significant trends statistically), they also emphasized that the type of fish consumed likely has a significant effect on the risk of developing sub-clinical atherosclerosis.

Dr. Holub's Comments:

It should be pointed out that the median intake of long-chain omega-3 fatty acids in the highest quintile as studied herein where apparent protection against the risk of sub-clinical atherosclerosis was exhibited was 220 mg/day. This intake of long-chain omega-3 fatty acids is significantly higher than the average intake of long-chain omega-3 fatty acids (EPA + DPA + DHA) as estimated by direct quantification in sectors of the adult population of North America, where average daily intakes of 135 mg have been reported (Denomme et al., J. Nutr., 135: 206-211 (2005)). In the latter study, it was determined that 87% of the daily intake of EPA + DPA (docosapentaenoic acid) + DHA combined was represented by EPA + DHA. The maximal apparent protection against sub-clinical atherosclerosis in this recent publication was found in the highest quintile with median intakes of non-fried fish of two servings/week. Such intakes are significantly above typical North American intakes, where the average consumption of fish (non-fried + fried) averages at an intake of approximately one serving every ten days with 50% of the population being found not to consume fish over a one-week period. Finally, the significant but relatively modest effects on circulating risk factors for cardiovascular disease with higher intakes of omega-3 fatty acids and non-fried fish (reductions in circulating triglyceride and elevations in HDL-cholesterol levels) are likely to only partially account for the apparent beneficial effects found with respect to atherosclerotic development, such that anti-inflammatory effects on endothelial functioning may be important in this regard. The failure of fried fish consumption to exhibit an apparent beneficial influence on sub-clinical atherosclerosis may be related to the concomitant presence of trans fatty acids.