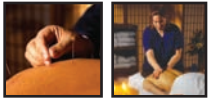




Omega-3 Fatty Acids:

Are they beneficial?

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Arrhythmia

In animal studies, fish oil, eicosapentaenoic acid (EPA), and/or docosahexaenoic acid (DHA)

appear to have beneficial effects on ventricular tachycardia (VT) and fibrillation (VF) in ischemia, but not reperfusion, induced arrhythmia models. They have no effect on the incidence of death and size, and have inconsistent results with regard to arrhythmia score, VF threshold, ventricular premature beats or length of time in normal sinus rhythm, compared to omega-6, monounsaturated, or saturated fatty acids (FAs) and no treatment controls. A meta-analysis of 13 studies using rat models showed that fish oil, but not alpha-linolenic acid, supplementation had a significant protective effect for ischemia- and reperfusion-induced arrhythmias by reducing the incidence of ventricular tachycardia and fibrillation.

There is evidence that omega-3 acid infusion reduces the induction of ventricular tachycardia. But among patients with a recent episode of sustained ventricular arrhythmia and an implantable cardioverter defibrillator, fish oil supplementation did not reduce the risk of VT or VF and may be proarrhythmic in some patients. In the recent Study on Omega-3 FAs and ventricular Arrhythmia (SOFA) trial, omega-3 FAs did not reduce arrhythmias in patients with implanted defibrillators.

Hypertriglyceridemia

Ten studies reported long-chain omega-3 FAs to be effective in the treatment of hypertriglyceridemia. The average decrease in triglycerides was 29%, total cholesterol 11.6%, very low-density lipoprotein 30.2%,

Studies on: coronary artery prevention

- Yzebe and Lievre did a meta-analysis of 10 randomized controlled trials (RCTs) with 14,727 patients that showed daily intake of omega-3 fatty acids (FAs) for a mean 37 months decreased all causes of mortality by 16% and the incidence of death due to myocardial infarction by 24%. Due to the suboptimal quality of the studies and the absence of data in patients receiving statins, the authors suggest that these results do not justify adding fish oils systematically to the heavy pharmaceutical assortment already recommended in patients with coronary heart disease (CHD).
- Harper and Jacobsen looked at trials comparing the impact of omega-3 polyunsaturated FAs, including eicosapentaenoic acid, docosahexaenoic acid and alpha-linolenic acid (ALA). There was a reduction in total mortality and sudden death without a clinically significant reduction in nonfatal myocardial infarction. The six trials with ALA supplements or an ALA-enriched diet were of poorer design than the fish oil trials and had limited power. They suggest a role for fish oil (eicosapentaenoic acid, docosahexaenoic acid) or fish in secondary prevention because recent clinical trial data have demonstrated a significant reduction in total mortality, CHD death, and sudden death. The data on ALA have been limited by studies of smaller sample size and limited quality.
- Balk, *et al* found that compared to placebo, the summary risk ratio of coronary artery restenosis after angioplasty with fish oil is 0.87 across 12 RCTs. Two prospective studies reported increased carotid intima-media thickness (IMT), whereas two cross-sectional studies reported a reduction of IMT thickness with fish, fish oil or ALA consumption. Three RCTs and three uncontrolled studies reported small, insignificant improvements in exercise capacity with fish oil. There are insufficient studies to draw conclusions about the effect of ALA and there was not enough long-term data on fish consumption or omega-3 FA supplementation to draw definitive conclusions about cardiovascular (CV) risk reduction.
- Another meta-analysis of cohort studies of over 200,000 patients with a 12 to 13 year follow-up examination indicated a 23% and 38% reduction in CHD mortality for those consuming two to four servings/week and > five/week respectively.
- A Cochrane review looked at 48 RCTs and 41 cohort analyses and concluded it was unclear if dietary or supplemental omega-3 fats alter total mortality, combined CV events or cancers in people with, or at high risk of, cardiovascular disease or in the general population. No evidence exists to advise people to stop taking rich

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sources of omega-3 fats, but further high-quality trials are needed to confirm suggestions of a protective effect of omega-3 fats on CV health. There is no clear evidence that omega-3 fats differ in effectiveness according to fish or plant sources, dietary or supplemental sources, dose or presence of placebo.

and LDL 32.5%. One study found LDL to increase by 25%. Since many of the randomly-controlled trials had serious shortcomings, the authors do not recommend routine use of omega-3 for hypertriglyceridemia.

Stroke

Ecologic/cross-sectional and case-controlled studies have generally shown an inverse association between consumption of fish and fish oils and risk of stroke. Results from five prospective studies have been less consistent, one showing no association, one showing a possible inverse association and three demonstrating a significant inverse association. The Nurses Health Study showed an insignificant lower relative risk of total stroke among women who regularly ate fish than among those who did not. A significant decrease in the risk of thrombotic stroke was observed among women who ate fish at least two times per week compared with women who ate fish less than once per month. These data support the hypothesis that consumption of fish several times per week reduces the risk of thrombotic stroke but does not increase the risk of hemorrhagic stroke.

Dementia

There is conflicting evidence with respect to dementia and omega-3. Although one study found no association for fish or omega-3 on cognitive function with normal aging, four studies seem to suggest a trend in favour of omega-3 FAs (fish and total omega-3 consumption) toward reducing risk of dementia and improving cognitive function. However, the available data are insufficient to draw strong conclusions about the effects of omega-3 FAs on cognitive function in normal aging or on the incidence or treatment of dementia.

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Infant development

There is evidence that infant formulas containing DHA provide improved performance on the Mental Development Index in term infants and better mental development in pre-term infants. One study demonstrated significantly better visual maturation of term infants fed long-chain FAs including DHA compared to control formula for a 12-month period. A meta-analysis of five RCTs involving term infants and three RCTs involving pre-term infants found that in term infants, ALA supplementation was associated with increased weight and length at 12 months, which was at least four months after the end of dietary intervention. There was a transient improvement in the retinal function of pre-term infants fed ALA-supplemented diets compared with controls.



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Additional resources available—contact *The Canadian Journal of Diagnosis* at diagnosis@sta.ca.

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