Key Summary of Conference Abstract

Effects of Marine Omega-3 Supplementation on Fatty Acids and Bioactive Lipids and Associations With Risk of Cardiovascular Disease: Secondary Analysis From the Randomized Vitamin D And Omega-3 Trial (VITAL)

Background

- Omega-3 fatty acid (n-3) may reduce the risk of incident cardiovascular disease (CVD), but the mechanisms involved are not fully understood.
- A better understanding of n-3 metabolism may provide clues to the mechanisms involved in preventing CVD.
- VITAL was a study in which n-3 supplementation was compared to placebo for the prevention of CVD; although n-3 did not lower the incidence of major CVD events in the overall study population, a subpopulation analysis suggested a potential CVD benefit among certain patient groups.[1]
- **Objective:** The investigators of this VITAL substudy (VITAL200) examined the effect of n-3 supplementation on fatty acid (FA) and bioactive lipid (BL) levels, and the association of FAs and BLs with CVD outcomes.

Methods

- Patients (n=200) from VITAL were balanced by demographic characteristics and randomized to treatment with a placebo or daily 840 mg n-3 supplement (460 mg eicosapentaenoic acid [EPA] + 380 mg docosahexaenoic acid [DHA]).
- At baseline and after 1 year, the levels of more than 800 FAs and BLs in plasma or red blood cells were analyzed using 3 independent assays.
- Associations between FA and BL levels, and downstream clinical lipid and inflammatory biomarkers, were evaluated.
- The effects of n-3 supplementation on 1-year changes in FA and BL levels were validated in two independent cohorts: Framingham Heart Study (FHS, n=2,479) and the Women's Health Study (WHS, n=4,946); incident CVD was also assessed in the FHS cohort.

Results

- Patients taking n-3 in the VITAL200 study had significant changes in levels of 95 FAs and BLs; among the 95 FAs and BLs:
  - Levels of EPA, omega 3:6, omega-3, DHA, and omega-3 docosapentaenoic acid (DPA-n3), increased by 10% to 150%
  - Levels of DPA-n6, docosatetraenoic acid, elaidic acid, arachidonic acid, dihomo-γ-linolenic acid, and nervonic acid decreased by 3% to 24%
- Associations of FA and BL levels with downstream clinical lipid and inflammatory biomarkers varied.
- Patients taking n-3 in the FHS study had similar changes in FAs and BLs:
  - Observed changes in 20 of the FAs and BLs were significantly associated with incident CVD (P<0.05).

Conclusions

- Randomized n-3 treatment led to a cascade of changes in FAs and BL mediators.
- Further research is needed to establish causal relationships and thereby guide more selective treatment targets for CVD risk reduction.

Poster presentation at the American Heart Association Scientific Sessions

Authors

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Reference

1. Manson JE, Cook NR, Lee IM, et al. *N Engl J Med*. 2019;380:23-32.