

P3712

The omega-3 fatty acid eicosapentaenoic acid (EPA) is inversely associated with ischemic brain infarcts in elderly patients with atrial fibrillation

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Funding Acknowledgement: Swiss National Science Foundation

Background: The association of individual omega-3 fatty acids (n-3 FAs) with ischemic stroke remains unclear. Experimental data strongly suggest that n-3 FAs reduce ischemic stroke due to their anti-thrombotic and anti-inflammatory properties. Yet, recent clinical trials yielded mixed results. While marine n-3 FA supplementation (1g/day) did not reduce stroke, icosapent ethyl, a purified eicosapentaenoic acid (EPA) ethyl ester (4g/day), significantly reduced stroke incidence in patients at high cardiovascular risk. In the current study, we examined the association of fish-derived EPA, docosapentaenoic acid (DPA), docosahexaenoic acid (DHA) and the plant-derived alpha-linolenic acid (ALA) with the prevalence of ischemic brain infarcts in elderly patients with atrial fibrillation.

Methods: In this cross-sectional analysis of the Swiss atrial fibrillation (swissAF) cohort study, we determined baseline whole blood n-3 FAs by gas chromatography according to the HS-Omega-3 Index methodology in 1665 patients aged ≥ 65 years with atrial fibrillation. Large non-cortical and cortical infarcts (LNCCI) were assessed by brain MRI. Total and individual n-3 FAs were correlated with the prevalence of LNCCI in a logit model with continuous factors. Analyses were adjusted for sex, age, body mass in-

dex, smoking, alcohol intake, family history of cardiovascular disease and atrial fibrillation, physical activity, hypertension, diabetes, chronic kidney disease, prior stroke, prior transient ischemic attack, aspirin, anticoagulation and type of atrial fibrillation.

Results: A total of 373 patients with LNCCI (22.4%) were identified. After adjustment, lower risk of LNCCI was associated with higher EPA (odds ratio [OR] 0.50 per increase of one percentage point EPA, 95% confidence interval [CI] 0.28–0.88) and a higher risk was detected with DPA (OR 2.39, 95% CI 1.43–4.01). No statistically significant association was detected with DHA (OR 1.13, 95% CI 0.94–1.35), ALA (OR 0.83, 95% CI 0.23–2.95) or total n-3 FAs (OR 1.03, 95% CI 0.92–1.16).

Conclusions: Higher levels of EPA are associated with a lower prevalence of ischemic infarcts in aged patients with atrial fibrillation. Unexpectedly, DPA shows a direct correlation with ischemic infarcts. This study demonstrates that individual n-3 FAs may differentially affect stroke risk and that supplementation of EPA may be an interesting strategy to prevent ischemic stroke in atrial fibrillation patients.