



Serum Long-Chain n-3 Polyunsaturated Fatty Acids and Risk of Atrial Fibrillation in Men



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BACKGROUND

- Atrial fibrillation (AF) is a common cardiac arrhythmia.
- Regular fish consumption has been shown to reduce the risk of AF in some, but not in all studies.
- Long-chain n-3 polyunsaturated fatty acids (PUFA) from fish have been suggested to account for the beneficial effects.

OBJECTIVE

- To study the association between the serum long-chain n-3 PUFAs eicosapentaenoic acid (EPA), docosapentaenoic acid (DPA) and docosahexaenoic acid (DHA) and risk of AF in men.
- To investigate whether serum concentration of an intermediate chain-length n-3 PUFA, alpha-linolenic acid (ALA, 18:3n-3), is associated with the risk, especially when the serum concentration of EPA, DPA and DHA is low.

METHODS

Study design, population

- Male participants 42-60 years of age enrolled in the Kuopio Ischaemic Heart Disease Risk Factor Study (KIHD) and free of AF at baseline in 1984-1989 (n = 2174).

Exposure Assessment

- Serum EPA, DPA, DHA and ALA at baseline.

Outcome Measurement

- The primary endpoint was atrial fibrillation.

Statistical Analysis

- Cox proportional hazards models were used to estimate relative risks (RR), adjusted for covariates.
- Absolute risk reduction (ARR) was calculated by multiplying the absolute risk (AR) in the reference group by the multivariable-adjusted RR reduction in the comparison group.

RESULTS

- The mean age of the study participants was 52.8 y (SD 5.3).
- The mean serum concentrations were 1.67% (SD 0.92) for EPA, 0.55% (SD 0.10) for DPA, 2.46% (SD 0.74) for DHA and 0.74% (SD 0.24) for ALA, of all serum fatty acids.
- A total of 240 (11%) men experienced an AF event during the 17.7 years of follow-up.
- After multivariable adjustments, men in the highest serum EPA+DPA+DHA quartile had a 35% (95% CI, 4-56%) reduction in the RR of AF, compared with men in the lowest quartile (AR in the reference group 13.4%; ARR 4.7%) (Model 2, Figure 1).
- Exclusion of subjects with myocardial infarction or congestive heart failure at baseline or preceding the AF event during the follow-up slightly strengthened the associations (Model 3).

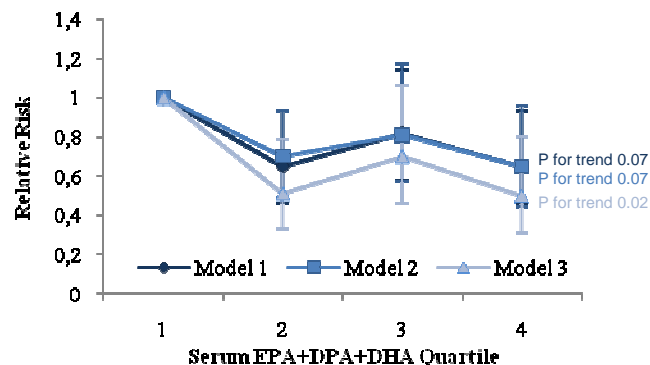


Fig. 1. Risk of atrial fibrillation in quartiles of serum EPA+DPA+DHA. Model 1: adjusted for age and examination years.

Model 2: adjusted for Model 1 and history of ischemic heart disease, congestive heart failure or stroke; diabetes; body mass index; smoking (never, former, current); pack-years of smoking; leisure-time physical activity; serum HDL and LDL cholesterol and triglycerides; systolic and diastolic blood pressure; treated hypertension; and hair mercury concentration.

Model 3: adjusted for Model 1 and history of stroke; diabetes; body mass index; smoking (never, former, current); pack-years of smoking; leisure-time physical activity; serum HDL and LDL cholesterol and triglycerides; systolic and diastolic blood pressure; treated hypertension; and hair mercury concentration after exclusion of subjects with myocardial infarction or congestive heart failure at baseline or preceding the AF event during the follow-up (n=233).

- When the fatty acids were examined individually, only serum DHA concentration was associated with reduced risk (Figure 2); the multivariable-adjusted RR was 38% (95% CI 8-58%) lower in the highest, compared to the lowest quartile (reference group AR 13.3%; ARR 5.1%).
- We did not find evidence that high serum ALA concentration would reduce the risk of AF in these men (Figure 2), not even when the serum EPA+DPA+DHA concentration was low (P for interaction 0.10).

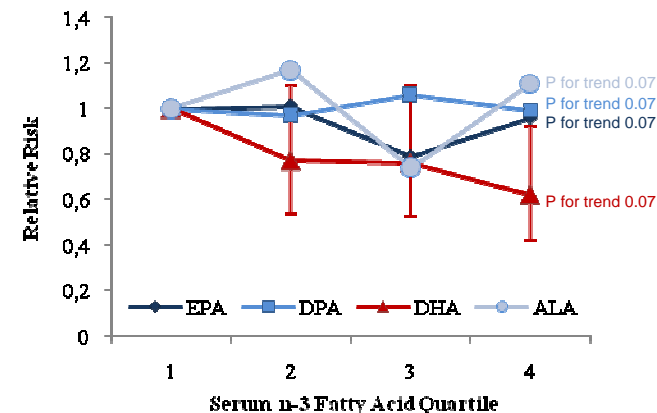


Fig. 2. Risk of atrial fibrillation in quartiles of serum n-3 fatty acids, adjusted for Model 2 in Figure 1.

CONCLUSIONS

- The results from this prospective population-based cohort study suggest that higher serum concentration of total long-chain n-3 PUFAs, mainly a marker of fatty fish or fish oil consumption, predicts reduced incidence of AF in men without prior AF.
- The effect seems to be attributable to the serum DHA concentration.

Acknowledgements

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