Circulating omega-3 fatty acids and neovascular age-related macular degeneration

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PURPOSE

The exudative form of age-related macular degeneration (AMD) accounts for almost 80 % of cases of severe vision loss related to AMD.

High dietary intake of omega-3 polyunsaturated fatty acids (n-3 PUFAs) and fish have been consistently associated with a decreased risk for AMD.

Because of the multiple difficulties of dietary assessment, circulating biomarkers may represent a more objective alternative for the assessment of nutritional status.

We report the associations of neovascular AMD with serum and red-blood cell membranes (RBCM) omega-3 PUFAs, which represent a more objective assessment of omega-3 PUFAs status.

METHODS

Design : Case control Study

Cases	Controls
- 290 patients - 55 to 85 years old - neovascular AMD in one eye and early AMD lesions in the other eye - patients from the Nutritional AMD Treatment 2 Study (NAT2)[1] - Eye examination included best-corrected visual acuity, slit lamp examination, fundus photography, and fluorescein angiography	- 144 subjects - ≥ 55 years old - normal visual acuity - no history of ocular diseases - normal fundus examination - normal fundus photography - from the same geographical area as the AMD cases

All participants were recruited and examined at the Department of Ophthalmology of Creteil between 2002 and 2008.

Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) composition in serum and RBCM were determined by gas chromatography from 12h-fasting blood samples and was expressed as percentages of total fatty acids profile.

Associations of neovascular AMD with dietary intake of seafood and circulating omega-3 PUFAs were estimated by logistic regressions adjusted for age, gender, *CFH Y402H, ARMS2 A69S,* and *ApoE4* polymorphisms, plasma triglycerides, hypertension, hypercholesterolemia and family history of AMD).

RESULTS

***Figure 1**. Association of the risk of neovascular AMD with serum EPA.*

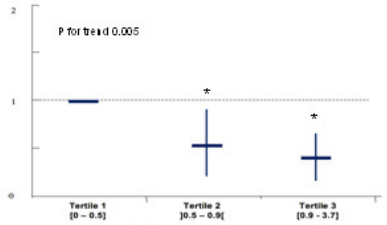


***Figure 2**. Association of the risk of neovascular AMD with serum DHA.*

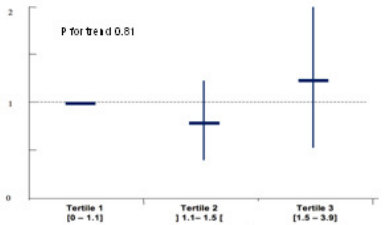
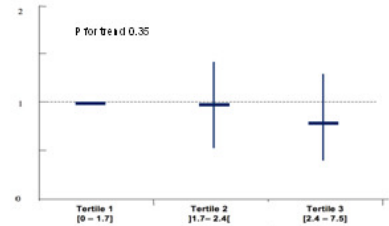


***Figure 3**. Association of the risk of neovascular AMD with serum EPA+DHA.*



OR estimated using logistic regression adjusted for age, gender, *CFH Y402H*, *ARMS2 A69S*, and *ApoE4* polymorphisms, plasma triglycerides, hypertension, hypercholesterolemia and family history of AMD. AMD patients n=290, Controls n=144 ; *p<0.05*

After adjustment for potential confounders, serum EPA was significantly associated with a lower risk for neovascular AMD (Tertile 3, OR=0.50, 95% CI 0.27;0.91; Tertile 3, OR=0.41 ; 95% CI 0.22;0.77), while serum DHA and EPA+DHA were not significantly associated with neovascular AMD.

***Figure 4**. Association of the risk of neovascular AMD with RBCM EPA.*

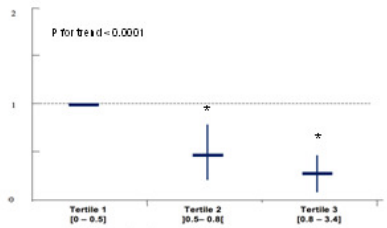


***Figure 5**. Association of the risk of neovascular AMD with RBCM DHA.*

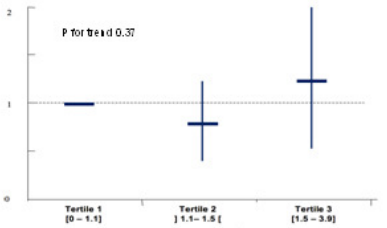
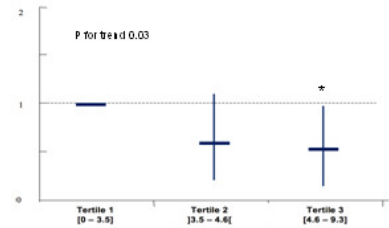


***Figure 6**. Association of the risk of neovascular AMD with RBCM EPA+DHA.*



OR estimated using logistic regression adjusted for age, gender, *CFH Y402H*, *ARMS2 A69S*, and *ApoE4* polymorphisms, plasma triglycerides, hypertension, hypercholesterolemia and family history of AMD. AMD patients n=290, Controls n=144 ; *p<0.05*

After adjustment for potential confounders, EPA and EPA+DHA were strongly associated with a lower risk for neovascular AMD (Tertile 3 OR=0.25, 95% CI 0.13;0.47 and OR=0.52, 95% CI 0.29;0.94, respectively). As in serum, DHA in RBCM was not significantly associated with neovascular AMD.

CONCLUSION

RBCM EPA and EPA+DHA, as long-term biomarkers of omega-3 dietary PUFA status, were strongly associated with neovascular AMD and thus represent an objective biomarker identifying subjects at high risk for neovascular AMD, whom may most benefit from nutritional interventions.

REFERENCES

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