

The allergy protective effects of fish oil: A matter of timing?

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10.1136/ebmed-2011-100254

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Commentary on: **Klemens CM**, Berman DR, Mozurkewich EL. The effect of perinatal omega-3 fatty acid supplementation on inflammatory markers and allergic diseases: a systematic review. *BJOG* 2011;**118**:916–25.

Context

Primary prevention strategies to curtail the development of allergic disorders have become paramount as allergy prevalence rises to epidemic proportions, specifically in regions undergoing western transition. While many factors have been implicated, decreased dietary intake of ω -3 polyunsaturated fatty acids (n-3 PUFA) and increased n-6 PUFA intake may affect allergy predisposition due to differential inflammatory potential and immunomodulatory effects of n-6 and n-3 PUFA. For decades, this has attracted interest in fish oil supplementation as a means of increasing n-3 PUFA intake and restoring fatty acid balance to treat and prevent allergic diseases. While treatment of established symptoms has proven overall ineffective, fish oil has shown more promise during early development, when immune plasticity is potentially greatest. Although the ideal 'window of opportunity' for primary prevention has not yet been well defined, allergic disease commonly manifests in the first months of life, indicating that, to be effective, interventions must be applied in pregnancy or the early postnatal period.

Methods

Klemens *et al* tackle this important and highly relevant issue with a systematic review including 949 subjects from five randomised controlled trials (RCTs). The following steps were taken to limit heterogeneity; (1) only studies where supplementation was started in pregnancy or lactation were included, and (2) the supplements used in the trials contained n-3 PUFA only.

Findings

The main findings of the present study were that fish oil supplementation during pregnancy reduced the risk of egg sensitisation ((OR) 0.33, 95% CI 0.16 to 0.70) and childhood asthma (0.349, 95% CI 0.154 to 0.788), whereas postnatal supplementation during lactation had no effect.

Commentary

The protection from food sensitisation by antenatal fish oil supplementation is quite convincing although based on two relatively small studies. The reduction in sensitisation was not reflected by a reduction in the development of food allergies and we agree with Klemens *et al* that there is a need for larger studies in the area to further examine the clinical relevance of the observed relationships.

The observation of protection from asthma was based on the results of two of the included studies.^{1 3} One of

these only examined respiratory outcomes at 1 year of age when a diagnosis of asthma cannot be reliably made¹ and the other was based on a 16 year registry-based follow-up of asthma.³ This heterogeneity in study design must inevitably limit the interpretation of the combined dataset and we would urge more cautious interpretations of the findings ahead of larger supplementation studies with comprehensive clinical follow-up.

The authors further conclude a lack of effect of postnatal intervention based on only one study⁴ and again, we agree that further studies in the postnatal period are required for conclusive data.

Adding to current knowledge, results from two new large RCTs, will be published in the near future. In what will be the largest randomised controlled trial of fish oil in pregnancy to date, the effect of fish oil supplements on infant allergic outcomes at 12 months of age has been evaluated and results are awaited with great interest (Palmer DJ *et al*, unpublished data). In the second randomised controlled trial, fish oil supplementation in the immediate postnatal period (from birth to 6 months of age), achieved no significant allergy reductions (D'Vaz N *et al*, unpublished data).

Collectively, the literature appears to be gathering strength to support a differential benefit of fish oil supplementation in pregnancy compared with the postnatal period alone. While this is reflected in the present systematic review, the limited data derived from the small number of studies currently limit the conclusions and clinical translation. A repeated meta-analysis including recent additional RCTs will improve clinical practice recommendations in the near future. Importantly, studies so far have shown no evidence of harm, to either mothers or infants, suggesting that fish oil supplementation may be a safe strategy to reduce the risk of some allergic manifestations.

Competing interests None.

References

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