

Effect of n-3 Polyunsaturated Fatty Acids in Asthma after low dose Allergen Challenge

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Background: We investigated the anti-inflammatory potential of n-3 polyunsaturated fatty acids (PUFA) on specific bronchial inflammation. Allergic asthmatics were challenged using a low-dose allergen provocation model.

Methods: Our parallel double-blinded study randomly assigned 23 house dust mite-allergic asthmatics (aged 22-29 years, 13 f: 10 m) to dietary supplementation with either n-3 PUFA enriched fat blend (0.69 g/per day), or placebo for five weeks. After three weeks, the patients were challenged with low doses of mite allergen for two weeks. Primary outcome parameters were effects on lung function (FEV1) and exhaled nitric oxide (eNO) as a marker of bronchial inflammation.

Results: Already before the bronchial challenge, eNO was significantly lower in the n-3 PUFA group ($p=0.014$). Levels of eNO increased during allergen exposure in both groups, but differences in means were significantly lower in the n-3 PUFA group ($p=0.022$). During the low dose allergen challenge, there were no differences between the groups in symptoms, FEV1, or the required allergen dose to induce deterioration of the lung function (PD20). Numbers of sputum eosinophils only tended to differ, while serum eosinophils (10.1%, $\pm 0.1.84$ versus 5.79%, ± 0.69) as well as changes of eosinophilic cationic protein (20.5 ng/ml, ± 9.93 versus -1.68 ng/ml, ± 4.36), and in vitro cysteinyl-leukotriene release (2,889 ng/ml, ± 872 versus 1,120 ng/ml, ± 173) were significantly lower in the n-3 PUFA group ($p<0.05$, each).

Conclusion: Our results provide evidence that dietary supplementation with n-3 PUFA is able to reduce bronchial inflammation even after low-dose allergen challenge.

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