

Abstract

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Omega-3 polyunsaturated fatty acids and bronchial inflammation in grass pollen allergy after allergen challenge.

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OBJECTIVE: Asthma is a major public health problem, with bronchial inflammation as the therapeutic target. The role of dietary fish oil derived polyunsaturated fatty acids (PUFAs) in allergic inflammation is controversial. Most asthmatics suffer from mild disease and non-pharmacologic interventions are attractive. This study investigates the anti-inflammatory potential of nutritional PUFAs in an experimentally induced bronchial inflammation.

METHODS: We examined 38 grass pollen allergic asthmatics and 19 controls. History of dietary PUFA intake was compared with levels of PUFAs in erythrocyte membranes, and stratified according to low (25th quartile; Q25) and high (75th quartile; Q75) ratios of omega-3 (n-3) to omega-6 (n-6) PUFAs as a surrogate for anti-inflammatory (Q75) or proinflammatory (Q25) effects. Bronchial inflammation was simulated with one-step inhalation of grass pollen. Bronchial response (exhaled nitric monoxide, eNO as surrogate for inflammation, decrease of FEV(1)) was correlated with levels of PUFAs in erythrocyte membranes.

RESULTS: Ratios of n-3/n-6 PUFA were significantly lower in asthmatics than in healthy controls. Levels of eNO were significantly higher in Q25 asthmatics than in Q75 asthmatics ($p = 0.040$). There was a trend of higher bronchial hyperreactivity in Q25 asthmatics (median PD(20) 0.27 vs. 0.14; n.s.), induced by specific bronchial challenge with grass pollen (FEV(1) decrease 16.7 vs. 23.1%; n.s.).

CONCLUSION: When stratifying for erythrocyte membrane PUFA content as a surrogate for alimentary intake, we found mild effects on bronchial allergic inflammation. Future intervention studies with pharmacological PUFA doses appear suitable to clarify dietary PUFA role as an adjunctive intervention to the established treatment of asthma. ClinicalTrials.gov No. NCT00519740.

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