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Abstract

The Relationship between Serum Polyunsaturated Fatty Acids and Dietary Inflammatory Index in Children with Recurrent Respiratory Infections †

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Abstract: Background and objectives: Respiratory tract infections are the most common cause of children's morbidity in the world. Children with recurrent respiratory tract infections (RRIs) frequently use health care services and antibiotics, undergo surgical procedures and are at risk of asthma in early life. In RRIs, the induction of the immune system and inflammatory processes is associated with changes in metabolic milieu; however, the polyunsaturated fatty acid (PUFA) blood profile in RRIs has not been well recognized. Diet is among the factors that can modulate inflammation; therefore, we aimed to investigate the effect of the inflammatory potential of diet on the serum PUFA profile in children with RRIs and on the risk of the disease. Methods: In 44 children with RRIs aged 3–16 years and 44 healthy children aged 2.5–17 years, dietary intake was assessed via 24 h dietary recall, then the children's dietary inflammatory index (C-DII) was calculated using dietary data. Serum PUFA levels were determined by gas-liquid chromatography-mass spectrometry, and immunological parameters were investigated in children with RRIs. Results: One-third of the RRI group had elevated IgE level and 14% had eosinophilia. Dietary intake did not differ in either group, except for significantly lower fiber intake in RRI children (7.97 g/1000 kcal vs. 9.43 g/1000 kcal, $p = 0.004$, respectively). The RRI group was characterized by the higher inflammatory potential of the diet than in the control group (C-DII = 0.26 vs. −0.92, $p = 0.000$). In the serum of RRI children, a higher level of linoleic acid, arachidonic acid, and eicosapentaenoic acid was shown than in healthy subjects. The C-DII score was positively associated with serum n-6 PUFA levels in both groups. The high inflammatory potential of the diet, low fibre intake, BMI over 75 percentile, and a lack of breastfeeding or its duration up to 6 months age were identified as RRI risk factors. Discussion: Our study indicates that assessing the inflammatory potential of diet and nutritional status may be crucial for determining comprehensive interventions in RRIs, as well as for establishing rational preventive management.

Keywords: recurrent respiratory tract infections; diet; inflammation; polyunsaturated fatty acids; serum

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Committee of Wroclaw Medical University (consent No. KB–162/2011).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Study protocol, statistical analysis plan and individual participant data will be available (including data dictionaries) beginning 3 months and ending 5 years following article publication. Proposals should be directed to daiva.gorczyca@charite.de; to gain access, data requestors will need to sign a data access agreement.

Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.