CCL17 and CCL20 levels in serum of children with sensitization to hen’s egg in regard to the outcome of the oral food challenge

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Aims: Food-specific IgE (sIgE) determines the sensitization to food but oral food challenges are necessary to determine the clinical relevance of a food allergy in most cases. Therefore the identification of other biomarkers could be of great interest. Previously, chemokine levels have been correlated with the severity of eczema and the sensitization status to food allergens. The aim of this study was to analyze if chemokine levels could predict a positive or negative outcome of a food challenge with hen’s egg.

Methods: 37 children sensitized to hen’s egg were included in the study. They underwent an oral food challenge with hen’s egg to proof its clinical relevance. Serum chemokines (CCL17 & CCL20) as well as total and sIgE were measured using an ELISA kit (R&D Systems) and the ImmunoCAP250 System® (Phadia) respectively. For statistical analysis the Mann-Whitney-U-test and the Spearman rank correlation were computed.

Results: The median age of the children (59.5% male and 40.5% female) was 2.6 years (range 0.8 – 14.9 years). 89.2% (33/37) of the children had eczema. 19 children (51.4%) had a positive hen’s egg challenge and therefore a clinical relevant hen’s egg allergy whereas 18 children (48.6%) were clinical tolerant. Median sIgE in the allergic patients was 1.9 kU/l (range 0.43 – 33.9 kU/l) and in the tolerant ones 0.6 kU/l (range 0.03 – 4.76 kU/l). Hen’s egg allergic children showed significantly higher serum levels of CCL17 (median 655.4 pg/ml; range 183.6 – 1394.4 pg/ml) compared to tolerant ones (median 501.6 pg/ml; range 172.8 – 1027.8 pg/ml) (p = 0.030). Furthermore there was a significant correlation of CCL17 with sIgE (r_s = 0.377, p = 0.014) and with the ratio of sIgE/total IgE (r_s = 0.455, p = 0.004). Regarding the chemokine levels of CCL20 there was no significant difference seen.

Discussion: Our previous studies have shown a strong correlation between serum levels of CCL17 and the severity of eczema in food-sensitized infants. In this study the serum levels of CCL17 could be significantly correlated to the level of hen’s egg-specific IgE and were significantly elevated in children with clinical relevant hen’s egg sensitization in comparison to clinical tolerant ones.

Conclusion: CCL17 might not only be a biomarker for severe eczema but also for clinical relevant hen’s egg allergy. However larger studies are necessary to prove these findings. Furthermore, determination of CCL17 will not be able to replace oral food challenge tests.