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Potential confounding factors in food allergy: eosinophilic inflammation markers

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Introduction: Food allergies can present with acute onset of symptoms (including anaphylaxis) following food allergen ingestion or develop as a chronic process as seen in atopic dermatitis. The immediate allergic reaction produces severe acute inflammation[1]. Although the importance of the late phase response, which corresponds to influx of eosinophils and basophils, is still unclear, there are studies speculating that it is involved in food-allergen induced forms of eosinophilic gastroenteritis[2].

Methods: Patients with urticaria-like symptoms were selected from the data bank belonging to the Allergology Clinic, comprising all patient data in the period of 2013 - April 2016. The patients were investigated for possible causes of cutaneous symptoms and were divided accordingly: parasite infestation, on-going infection and histamine intolerance were taken into account besides food allergy. A total number of 150 individuals fulfilled the selection requirements, including 82 women and 68 men.

Results: Out of the 150 selected patients, 109 patients presented with urticaria-like lesions (72,7%) of which 81 patients (54%) had a diagnosis of urticaria. Urticaria-like skin lesions include as mentioned above: Chronic and acute urticaria, angioedema and dermographism. Additionally, 11 (7,3%) patients had eczema, 28 patients (18,7%) had atopic dermatitis and 5 patients had no skin manifestation but the diagnosis of food allergy. It is important to mention that there are cases where more than just one urticaria-like lesion was present (e.g. the patient presented an angioedema and dermographism simultaneously).

The relative count of serum ECP level positively correlates with relative percentage of peripheral eosinophils (rs =.300, p =.010). The frequency distribution sustains the hypothesis that high serum ECP level correlates with presence of food allergy by showing that out of the 29 patients having a skin manifestation and food allergy, 20 (69%) of the patients had an increased ECP value and only 9 (31%) of them had a normal value.

Other confounding factors: a weak negative correlation between parasite infestation and skin manifestations (r= -.191, p =.019) is stated.

After excluding food allergy, parasite infestation, low DAO level and infection, Pearson product-moment calculation states with a correlation coefficient of r=.352 (p=.002), that high sECP itself has a relationship with skin manifestations.

Discussions: Eosinophils have a limited life-time in the bloodstream (t ½ <1 day), but can persist in tissues for many weeks in favourable conditions. Thus, the eosinophil count in peripheral blood does not correlate well with the severity of symptoms and thereby does not reflect current inflammation. Although eosinophils are active - and therefore mainly found - in tissue and not in peripheral blood[3], we supposed that the more eosinophils are activated, the higher is the eosinophil count in blood. The relative value of eosinophils in blood (Eorel) does not represent a nominal variable for stating whether eosinophils are present or not, but represents the number of times eosinophils are elevated from the normal value.

Since ECP represents a granule released by activated eosinophils[4], there is a reasonable assumption that an association exists between the relative ECP value (ECPrel) and Eorel. Although the frequency distribution – showing that out of 29 food allergy patients, 20 (69%) had an increased serum ECP level – sustains a link between food allergy and serum ECP levels, the number of patients included is too small in order to be statistically evaluated.
Conclusions: Peripheral eosinophils themselves do not reflect ongoing inflammation as does their granule ECP, which is released into the blood stream by activated eosinophils, which in turn are found in tissue. Here, serum ECP shows better represent the severity of ongoing inflammation. According to these findings, serum ECP can be used as a clinical marker for better assessment of patients having food allergies and skin manifestations in particular. By evaluating serum ECP, the severity of ongoing inflammation can be adjusted accordingly. Since adverse effects of glucocorticoids usage, especially in children, are significant, doctors aim to keep its dosage at a minimum. Here, serum ECP could be used as guidance level for glucocorticoid dosage.

Figure 1

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