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Issue 3

CAPture

A Selection of Recent Allergy Papers

SYNOPSIS

- Patients (n=123) with venom reactions up to 10 years ago were recruited from an allergy clinic.
- IgE antibodies to honeybee (BV) and *Vespula* (VV) venom extracts, cross-reactive carbohydrate determinants (CCDs) and recombinant Api m 1 (honeybee) and Ves v 5 (*Vespula*) were analyzed by ImmunoCAP® (Phadia AB, Uppsala, Sweden) with a cut-off at 0.35 kU_A/l.
- Allergen-specific IgE to BV and VV were significantly ($p<0.0001$) correlated ($r=0.82$) to corresponding venom component.
- Classification was based on patients' reports; 28% honeybee reaction, 48% to *Vespula* and 24% unknown.
- Patients' reports were verified by sensitization to corresponding venom-specific component in 86% of cases.

Citation: Hofmann SC et al. Added value of IgE detection to rApi m 1 and rVes v 5 in patients with Hymenoptera venom allergy. J Allergy Clin Immunol 2011;127:265-7.

Roughly 60% of patients' double positivity to *Hymenoptera* extract is in fact due to a genuine sensitization either to honeybee or *Vespula*, and not to both

Serological double positivity (DP) to honeybee and *Vespula* venom extracts in patients with venom anaphylactic reactions can be caused by cross-reactivity to homologous venom peptides, cross-reactive carbohydrate determinants (CCDs) or might be a genuine double-sensitization to both species. Identifying the sensitizing species is important in optimizing the venom immunotherapy and to avoid unnecessary treatment with non-relevant venom toxins. The aim of the present study was to evaluate if the recently launched ImmunoCAP tests to the recombinant species-specific venom components Api m 1 (honeybee) and Ves v 5 (*Vespula*) could be used to discriminate between double sensitization and cross-reactivity.

Sera from patients with anaphylactic reactions to *Hymenoptera* venoms were studied where 52% were shown to be DP to venom extracts. In these DP patients 57.8% were sensitized to only one of the recombinant species-specific venom components and 36% to both. Sensitization to both species was more common in patients with concomitant sensitization to CCDs (48% vs. 24%).

The authors conclude that detection of IgE antibodies to rApi m 1 and rVes v 5 is a reliable method to optimize patient selection for immunotherapy and avoid unnecessary treatment.

SYNOPSIS

- Sera were recruited from geographic areas were tick bites are common (Virginia, Southeastern US, Kenya, Ecuador) and rare (Northern Sweden, Boston).
- Total serum IgE and allergen-specific IgE were measured by ImmunoCAP®. Biotinylated tick proteins (*A. americanum*, *D. variabilis*) and oligosaccharide galactose-α-1,3-galactose (α-Gal) were coupled to ImmunoCAP Streptavidin.
- Based on questionnaire more than 90% of individuals with IgE antibodies to α-Gal had a history of tick bites.
- Most patients (97%) with anaphylaxis to mammalian meat in areas were tick bites are common had IgE antibodies to α-Gal.
- The percentage of positive test to α-Gal in areas where tick bites are common varied from 20% to 76%, compared to <1% to 2% in areas where it is rare.

Citation: Commins SP et al. The relevance of tick bites to the production of IgE antibodies to the mammalian oligosaccharide galactose-α-1,3-galactose. J Allergy Clin Immunol 2011;127:1286-93.

IgE antibodies to the oligosaccharide α-Gal, induced by tick bites, are relevant for food allergy to mammalian meat

It has recently been shown that IgE antibodies to the oligosaccharide α-Gal are responsible for food allergy specific to non-primate mammalian meat that contains this epitope, whereas tissues from human, fish and poultry do not. It has also been shown that patients with these IgE antibodies might get anaphylactic reaction if treated with biological drugs based on monoclonal antibodies containing the α-Gal epitope.

The aim of this study was to identify possible triggers of this IgE production. Since drug reactions caused by IgE antibodies specific to α-Gal showed regional differences some environmental allergens such as parasites, molds or ticks have been suspected. In this study special attention was focused on tick bites. IgE antibodies to α-Gal and proteins from two different tick species were measured. In three tested patients the IgE concentrations to α-Gal increased dramatically in close time relation to multiple tick bites. An increase in serum IgE to dog dander was also shown but not to other inhalation allergens such as grass, birch or mites. In two of those patients who showed clinical food allergy to meat, IgE antibodies to α-Gal represented 30% of total serum IgE compared to less than 1% for a nonfood-allergic patient. It was also shown that α-Gal IgE antibodies were much more frequent in geographic areas where tick bites are common.

The authors conclude that multiple bites of certain ticks trigger serum IgE to α-Gal, which can results in meat food allergy but also complicates diagnosis of animal dander allergy.

SYNOPSIS

- Children were recruited from two birth cohorts and examined at the age of 5 years (UK) and 14 years (Australia).
- Current wheeze was defined as wheeze in the previous 12 months by identical validated questionnaires.
- UK cohort reported current wheeze at 20.1% and the Australian at 13.4%.
- Allergen-specific IgE to cat extract and IgG/IgG4 to rFel d 1 were determined by ImmunoCAP® technology.
- There was a high correlation ($r=0.88$) between serum IgE to cat extract and the major cat allergen component rFel d 1 (measured in a UK subsample).
- In univariate analysis the predicted risk of current wheeze increased significantly with increased IgE to cat dander extract in both cohorts (OR 1.56/UK; OR 1.29/AU).

Citation: Custovic A et al. Allergen-specific IgG antibody levels modify the relationship between allergen-specific IgE and wheezing in childhood. J Allergy Clin Immunol 2011;127:1480-5.

The serum level of allergen-specific IgG but not IgG4 to the cat allergen component Fel d 1 is related to the risk of current wheeze in children

The authors have in recent publications shown that the sum of allergen-specific IgEs is a better predictor of IgE-mediated respiratory symptoms than the total serum IgE level or just the presence of allergen-specific IgE.

There are, however, conflicting results in studies about the role of anti-cat IgG antibodies for the clinical expression of symptoms in cat sensitized children. The aim in this study was to readdress this issue by using an assay to measure high-affinity IgE response to the major cat allergen component (Fel d 1) in two birth cohort at the age of 5 and 14 years respectively.

Multivariate analysis was used to measure the risk of wheezing in the two birth cohorts. A 1.33- and 2-fold risk increase for UK and Australia respectively was shown per logarithmic unit increase of cat-specific IgE, and a 1.28- and 2.17-fold risk decrease per logarithmic increase of Fel d 1-specific IgG. No significant association could be shown between Fel d 1-specific IgG4 antibodies and current wheeze or an interaction between IgE, IgG or IgG4 antibody levels.

The authors conclude that Fel d 1-specific IgG, but not IgG4, interferes with the expression of IgE-associated wheezing in children. They therefore suggest that measurements of allergen-specific IgG antibody levels might improve the diagnostic accuracy of IgE antibody measurements.

Phadia