

ORIGINAL ARTICLES

Hypersensitivity to *Vespula* and *Polistes*: Can we tell the primary sensitization from the clinical history?

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ABSTRACT

Objective: To study the relationship between the primary sensitization to wasp venoms and the geographical and seasonal circumstances of the anaphylaxis-induced sting.

Methods: We performed a retrospective review of 115 patients (age 10-80) who suffered a systemic reaction to a wasp sting. Season and type of locality (urban or rural) at the moment of the sting were recorded. Serum specific IgE levels to venoms from *Vespula* and *Polistes* were measured, and a primary sensitization was determined to whichever genus of wasp for which the highest class of specific IgE was observed. The primary sensitization in relation to the type of locality and the season was assessed using the *chi-square* test.

Results: Most reactions occurred in urban areas (67.8 %), and in the summer season (63.4 %). Most patients were sensitized to *Vespula* venom (94.8 %). Primary sensitization was to *Vespula* in 56.5 %, to *Polistes* in 10.4 %, and undetermined in 33 %. The

distribution of geographical areas did not show significant differences in relation to primary sensitization ($p > 0.05$). Most patients with primary sensitization to *Vespula* suffered the anaphylaxis-induced sting after the spring season, with a statistically significant result ($p < 0.05$).

Conclusion: In our population, the probability of *Vespula* sting is higher than *Polistes* sting when the reaction occurs after spring. This finding can help us to identify the responsible vespidae when the diagnostic tests do not provide an accurate result.

Key words: *Hymenoptera* venom. Hypersensitivity. Venom allergy.

INTRODUCTION

IgE-mediated hypersensitivity to both *Vespula* and *Polistes* species is frequently observed in patients who present with a systemic reaction to wasp sting¹⁻⁶. This double sensitization has important implications for proper venom immunotherapy. Most *in vitro* studies suggest a possible cross-reactivity between venoms from common wasp (*Vespula*) and paper wasp (*Polistes*), but the primary sensitization and the clinical significance are not clear enough²⁻¹¹. We therefore examined the geographical and seasonal circumstances of the sting to know their relationship with the results of serum specific IgE to vespidae venoms.

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MATERIAL AND METHODS

A retrospective study was performed on 115 patients (10-80 years of age) presenting to the Allergy Department of the Puerta de Hierro University Hospital (Madrid), between January 1, 1994 and December 31, 2005. All patients suffered an immediate systemic reaction to wasp sting, and showed serum specific IgE to venoms from *Vespula* and/or *Polistes*, which was measured using the Pharmacia CAP System method (Uppsala, Sweden). The patients were resident in the north-western area of the Community of Madrid. Every patient was asked about the specific circumstances at the moment of the anaphylaxis-induced sting, which included season (spring, summer, autumn and winter) and type of locality (urban or rural). Results of the specific IgE to wasp venom were obtained from a review of the medical record. Patients were determined as having primary sensitisation to whichever genus of wasp (*Vespula* and/or *Polistes*) for which the highest class of specific IgE was observed. When a patient showed the same class of specific IgE to both venoms, an undetermined result was assigned.

The data were recorded and analysed using SPSS for Windows, version 12.0. The relationship between primary sensitization and season, as well as primary sensitization and type of locality, were assessed by the *chi-square* test. Differences were considered statistically significant at *p* values of less than 0.05.

RESULTS

The average age was 40.2 years (standard deviation: 15.9), and the male/female ratio was 60/55. The sting that caused the reaction took place in rural areas in 37 cases (32.2 %), whereas urban areas accounted for 78 cases (67.8 %). The distribution of cases according to season resulted in the following: 18 (17.3 %), spring; 66 (63.4 %), summer; 19 (18.3 %), autumn; and 1 (0.9 %), winter. One hundred and nine patients (94.8 %) showed serum specific IgE to *Vespula*, whereas IgE to *Polistes* was detected in 90 (77.8 %). The primary sensitization was to *Vespula* in 65 cases (56.5 %) and *Polistes* in 12 cases (10.4 %). There were no differences between the levels of specific IgE to both venoms in 38 patients (33 %).

The analysis of the primary sensitization related to geographical area showed that the urban area was more frequent in all groups (*Vespula*, *Polistes*, and undetermined sensitization), with no statistically significant differences ($p > 0.05$) (fig. 1). The frequency of sensitization related to season showed a higher number of patients with primary sensitization to

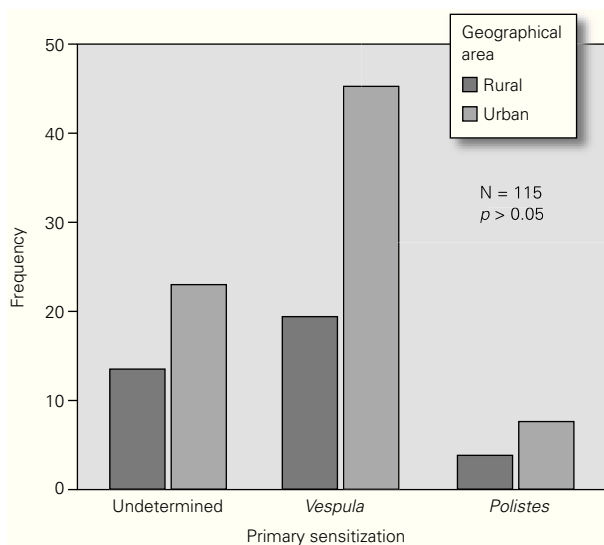


Figure 1.—Clustered bar charts for geographical area and primary sensitization.

Vespula among the cases occurring in summer and autumn (fig. 2). To analyze properly this difference, the patients with undetermined sensitization were deleted and the variable season was categorized into two values: spring and other season. Thus, we obtained a distribution of 71 cases with a statistically significant higher frequency of patients with primary sensitization to *Vespula* who suffered the reaction after the spring, in contrast with the patients who were primarily sensitized to *Polistes* ($p < 0.05$) (fig. 3).

DISCUSSION

Our study population shows a higher frequency of hypersensitivity to *Vespula* venom, in contrast with studies in the Mediterranean area of Spain, where hypersensitivity to *Polistes* venom is more frequent^{3,4}. Nevertheless, most patients were sensitized to both *Vespula* and *Polistes*. This fact may be explained by the presence of cross-reactivity, as it is well recognised in several prior studies³⁻¹¹.

Most cases of anaphylaxis-induced sting occurred in urban areas, probably because the region in which the study took place is comprised primarily of residential neighbourhoods. The geographical area could not provide information about the primary sensitization. This result suggests that both vespids share the same habitat, with no discrimination between rural and urban areas.

On the other hand, the seasonal distribution of the cases is certainly related to the primary sensitization. We observed that the probability of *Vespula* sting is higher than *Polistes* sting when the reaction occurs

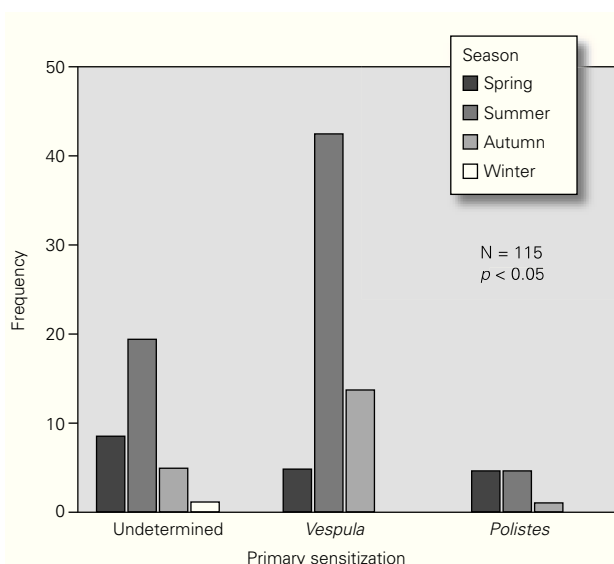


Figure 2.—Clustered bar charts for season and primary sensitization.

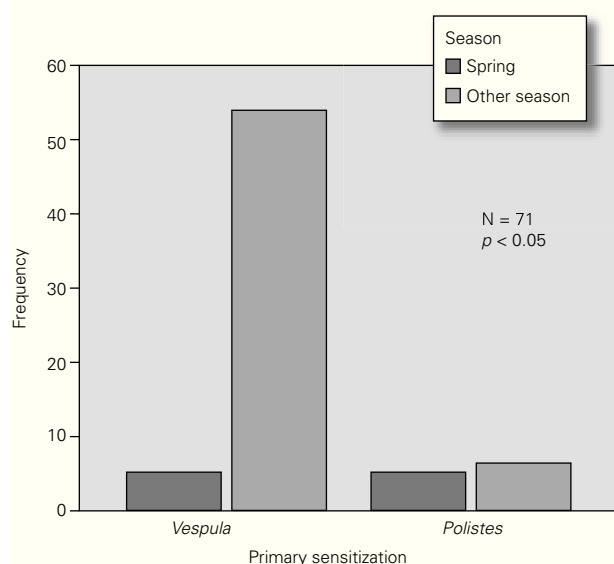


Figure 3.—Clustered bar charts for season (given as “spring” and “other season”) and primary sensitization (excluding cases with undetermined sensitization).

after spring. This finding is of interest in clinical practice, can help us to identify the responsible vespidae when the diagnostic tests do not provide an accurate result, and may be useful for the selection of the right venom for specific immunotherapy.

REFERENCES

1. Pérez Pimiento AJ, González Sánchez LA, Prieto Lastra L, Rodríguez Cabrerros MI, Iglesias Cadarso A, Rodríguez Mosquera M. Anafilaxia por picadura de himenóptero: estudio de 113 casos. *Med Clin* 2005;125:417-20.
2. Mingomataj E, Ohri D, Dhimitri V, Privtanji A, Qirko E, Pani L, et al. Hymenoptera sting anaphylactic reactions in the Mediterranean population of Albania. *J Invest Allergol Clin Immunol* 2003;13:272-7.
3. Blanca M, Miranda A, Fernández J, Terrados S, Vela JM, González JJ, et al. Allergic reactions to vespids: comparison of sensitivities to two species in a Mediterranean area. *Clin Allergy* 1988;18:21-7.
4. Ávila MJ, Blanca M, Miranda A, García JJ, Rico C, et al. Reacciones alérgicas a vespídeos II. Estudio de la distribución de sensibilidades y reactividades cruzadas a los vespídeos frecuentemente encontrados en España. *Rev Esp Alergol Inmunol Clin* 1989;4:103-10.
5. Puyana J, Díez Gómez ML, Cuevas M, Quirce S, Fernández Rivas M, Hinojosa M. Stinging insect allergy: sensitization to vespids in Madrid and surroundings. *Allergy* 1990;45:126-9.
6. García BE, Echechipia S, Olaguibel JM, Rodríguez A, Quirce S, Lizaso MT, Tabar AI. Sensibilización y reactividad cruzada en la alergia a vespídeos en Navarra. *Rev Esp Alergol Inmunol Clin* 1997;12:218-22.
7. González J, Blanca M, Miranda A, Fernández J, Amat M, et al. Crossreactivity between the three vespids found in Europe. *Allergy* 1988;43:20.
8. Hoffman DR. Allergens in Hymenoptera venom VI: Cross reactivity of human IgE antibodies to the three vespidae venoms and between vespidae and paper wasp venoms. *Ann Allergy* 1981;46:304-9.
9. Hoffman DR. Allergens in Hymenoptera venom XV: The immunologic basis of vespidae venom cross reactivity. *J Allergy Clin Immunol* 1985;75:611-3.
10. Hoffman DR. Allergens in Hymenoptera venom XVI: Studies of the structures and cross-reactivities of vespidae venom phospholipases. *J Allergy Clin Immunol* 1986;78:337-43.
11. Hamilton RG, Wisenauer JA, Golden DBK, Valentine MD, Adkinson F. Selection of Hymenoptera venoms for immunotherapy on the basis of patient's IgE antibody cross-reactivity. *J Allergy Clin Immunol* 1993;92:651.