Correlation between skin prick test wheal sizes to 7 different pollen extracts in polysensitized patients in Spain

Javier Subiza, MD†, Enrique Fernández-Caldas PhD††; Jesús Pola, MD*; Ángel Moral, MD‡ and Francisco Feo, MDđ

† Subiza Asthma and Allergy Centre, Madrid; †† Inmunotek Laboratory, Madrid; * Allergy Unit, Sagasta Policlinic, Zaragoza; ‡Allergy Unit, Virgen del Valle Hospital, Toledo; đAllergy Unit, General Hospital, Ciudad Real, Spain

BACKGROUND

- Sensitization to various pollen species has practical implications in the management of allergic patients, especially in the diagnosis and treatment.
- Allergic patients are more often polysensitized than monosensitized.
- To identify monosensitized patients in Spain is difficult, especially in adults.

OBJECTIVES

The aim of this study was to detect correlations between the wheal sizes of the most important pollens implicated in allergic respiratory diseases in Spain.

MATERIALS & METHODS

Thirteen allergy clinics from 13 different Spanish cities participated in this study. Patients were selected on the basis of a history of seasonal, or perennial allergic rhinitis and/or asthma. Patient evaluation was performed by a physician and included case history, clinical examination and skin prick tests. From this group, we selected the patients with positive skin prick tests to pollens and seasonal clinical symptoms; 1,536 patients were included (48% male and 52% female). All were born and still living in, or around, each study site.

MATERIALS & METHODS - 2

Mean age was 32 years (range 8 to 81 years).

All patients were skin tested with a standardized, commercially-available, battery of aeroallergens at 50 HEP, which included *Cupressus arizonica, Platanus hispanica*, *Trisetum paniceum, Dactylis glomerata, Olea europaea, Chenopium album* and *Parietaria judaica.*

Steel lancets were used (one lancet per antigen, to avoid cross-contamination). Histamine chlorhydrate at 10 mg/ml was used as a positive control and 50% glycerol-saline as a negative control.

All skin-test sites were evaluated after 20 minutes. The area of each wheal was measured by plannimetry using an automated system.

Skin prick test results were expressed in mm^2.

A positive reaction was defined as a wheal of at least half the size of the histamine wheal in the absence of a reaction to the negative control.

Spearman rank correlation coefficient was used to correlate the wheal area of different pollens.

Acknowledgements: Badajoz: Drs. J.M. García Menaya, I. González Galán and C. Cordobés; Barcelona: Drs. J. Belmonte, J.M. Roure, A. Cadahia and J.L. Eseverri; Bilbao: Drs. I. Antepara, Y. Alvarez and J. San Atilano; Burgos: Drs. P. Carretero, S. Porres and S. Juste Picón; Ciudad Real: Drs. F. Feo Brito, P. Mur Gimeno and E. Gómez Torrijo; La Coruña: Drs. M. Ferreiro Arias and M.A. Rico Díaz; Logroño: Dr. T. Lobera; Madrid: Drs. J. Subiza, M. Masiello, M.J. Narganes and C. Barjau; Santander: Drs. V. de Benito and J. Soto; Sevilla: Drs. A. Chaparro, J. Delgado and J. Conde; Toledo: Drs. A. Moral and C. Senent; Vitoria: Drs. G. Gastaminza, Y. Álvarez, J. San Atilano and D. Muñoz Lejarazu; Zaragoza: Drs. J. Pola, C. Zapata and E. Sanz

RESULTS

- The Spearman rank correlation coefficient (r_s) between the wheal areas to the different allergens was as follows (Table 1):

- *T. paniceum* vs. *D. glomerata,* grasses with a high degree of cross-reactivity was: 0.67
- *C. arizonica vs. O. europaea*: 0.52
- *P. hispanica vs. P. judaica*: 0.43
- *P. hispanica vs. Ch. album*: 0.41
- *Ch. album vs. P. hispanica: 0.37*
- *P. hispanica vs. T. paniceum:* 0.37
- All other correlations were below 0.3
- The lowest correlations obtained was between *P. judaica and O. europaea*: 0.03

Table 1. Correlation between skin prick test wheal sizes to 7 different pollen extracts

	C arizonica	*Platanus*	*Trisetum*	*Olea*	*Cheno.*	*Parietaria*
C arizonica		r_s = 0.12 n = 373 $p < 0.05$	r_s = 0.19 n = 373 $p < 0.05$	r_s =0.52 n = 373 $p < 0.05$	r_s = 0.18 n = 373 $p < 0.05$	r_s = 0.11 n = 373 $p < 0.05$
Platanus	r_s = 0.14 n = 572 $p < 0.05$		r_s = 0.31 n = 572 $p < 0.05$	r_s = 0.27 n = 572 $p < 0.05$	r_s =0.41 n = 572 $p < 0.05$	r_s =0.43 n = 572 $p < 0.05$
Trisetum	r_s = 0.13 n = 1448 $p < 0.05$	r_s = 0.24 n = 1448 $p < 0.05$		r_s = 0.24 n = 1448 $p < 0.05$	r_s = 0.21 n = 1448 $p < 0.05$	r_s = 0.17 n = 1448 $p < 0.05$
Olea	r_s = 0.12 n = 993 $p < 0.05$	r_s = 0.13 n = 993 $p < 0.05$	r_s = 0.15 n = 993 $p < 0.05$		r_s = 0.18 n = 993 $p < 0.05$	r_s = 0.08 n = 993 $p < 0.05$
Cheno.	r_s = 0.20 n = 772 $p < 0.05$	r_s = 0.37 n = 772 $p < 0.05$	r_s = 0.23 n = 772 $p < 0.05$	r_s = 0.28 n = 772 $p < 0.05$		r_s = 0.40 n = 772 $p < 0.05$
Parietaria	r_s = 0.04 n = 292 $p = 0.39$	r_s = 0.22 n = 292 $p < 0.05$	r_s = 0.21 n = 292 $p < 0.05$	r_s = 0.03 n = 292 $p = 0.55$	r_s = 0.04 n = 292 $p = 0.39$	

r_s > 0.4; $p < 0.05$ | r_s 0.2 - 0.4; $p < 0.05$ | r_s 0.1- 0.19; $p < 0.05$ | r_s < 0.1; $p > 0.05$

You can see that the correlation of *Cupressus* with *Olea*, Spearman Rank Test (*rs)* (0.52 was close to that of *Trisetum and Dactylis (rs = 0.67), grasses with a high degree of cross-reactivity*

CONCLUSIONS

1. We have identified intriguing relationships between wheal sizes to different allergens in polysensitized patients in Spain.
2. Some of these similarities may be due to cross-reactivity, a genetic predisposition, or to co-exposure to the offending allergens.
3. This study may add valuable information to the identification of risk factors associated with polysensitization in Spain.

Conflicts of interest: the authors declare no conflicts of interest in the performance of this study and regarding this presentation.