Case Report

Simultaneous Allergy to Vine Pollen and Grape

P Mur,[1] F Feo Brito,[2] B Bartolomé,[3] PA Galindo,[2] E Gómez,[2] J Borja,[2] A Alonso[2]

[1] Allergy Unit. Hospital Santa Bárbara, Puertollano, Ciudad Real, Spain
[2] Allergy Section, Hospital Complex, Ciudad Real, Spain
[3] R & D Department, Bial-Arístegui, Bilbao, Spain

Abstract. We report the case of an 18-year-old female student suffering from seasonal rhinoconjunctivitis with sensitization to pollens from vine and also from grass, olive, and Chenopodiaceae plants who had recently developed episodes of itching, maculopapular rash, and facial angioedema after eating grapes. Testing revealed positive reactions to vine pollen and grapes, and specific IgE were found for both allergens. Immunoblotting and inhibition assays revealed cross-reactivity between the allergenic structures of vine pollen and grape fruit and also among botanically unrelated pollens.

Key words: Food allergy. Fruit allergy. Grape. Vine pollen allergy. Immunoblotting.

Resumen. Presentamos el caso de una estudiante de 18 años con síntomas de rinoconjuntivitis estacional por sensibilización a pólenes de vid y también de gramíneas, olivo y Quenopodiáceas. Recientemente había presentado varios episodios de prurito, erupción maculopapular y angioedema facial tras comer uvas. Los tests cutáneos mostraron reacción positiva para polen de vid y uva y se detectó IgE específica para ambos alérgenos. El inmunoblotting y los estudios de inhibición mostraron reactividad cruzada entre las estructuras alergénicas de polen de vid y uva y también entre pólenes no relacionados botánicamente.

Palabras clave: Alergia por alimentos. Alergia por frutas. Uva. Alergia a polen de vid. Inmunoblotting.

Vitis vinifera is one of the oldest cultivated plants in the world. It grows in temperate and subtropical climates. Vine pollen has been shown to elicit rhinoconjunctivitis and seasonal asthma [1]. Furthermore, grape allergy has been associated with allergy to pollens, other fruits, and latex [2].

We report a case of simultaneous allergy to vine pollen and grape in which analyses were performed to detect the presence of serum IgE that cross-reacted with vine pollen and grape allergens.

Case Description

An 18-year-old female student was referred to the Allergy Unit of the Hospital Complex, Ciudad Real after years suffering from seasonal rhinoconjunctivitis with sensitization to pollens from vine, grass, olive, and Chenopodiaceae plants. During the previous 2 years she had developed 2 episodes of generalized itching, maculopapular rash, and facial angioedema a few minutes after eating grapes. Symptoms disappeared after treatment in emergency services. Skin prick tests (SPT) using a battery of common inhalant allergens (Bial-Arístegui Laboratories, Bilbao, Spain) revealed positive reactions to pollens from *Lolium perenne* (wheal size, 5×4 mm), *Olea europaea* (6×5 mm), and *Salsola kali* (4×3 mm). Positive reactions were also observed in SPT with extracts from *V vinifera* pollen (4×4 mm) and commercial grapes (5×5 mm) and prick by prick tests with grapes (5×4 mm). SPT with other fruits revealed positive reactions to peach (5×4 mm), banana (6×5 mm), kiwi (6×4 mm), and cherry (3×3 mm), and negative reactions to latex and apple. A conjunctival challenge test to vine-pollen extract was positive at 1 mg/mL and a positive response to an oral provocation (open challenge) test was observed at 10 minutes after eating the first dose (1 grape). The patient developed urticaria in the trunk, arms, and legs that disappeared after corticosteroid and antihistamine treatment. Serum levels of specific IgE, analyzed using the CAP method, were 10.1 kU/L in response to grape extract, 3.3 kU/L to *S kali* pollen, 4.8 kU/L to *L perenne*

pollen, and 7.5 kU/L to *O europaea* pollen. Analysis of serum IgE concentration using the enzyme allergosorbent test revealed a concentration of 2.2 kU/L in response to *V vinifera* pollen. Sodium dodecyl sulphate polyacrylamide gel electrophoresis and immunoblotting with grape extract revealed IgE-binding bands at 63, 60, 52 and 26 kilodalton (kd), and other faint bands between 44 and 30 kd; when vine pollen extract was studied, IgE-binding bands were observed at 63, 59, 49, 43 and 40 kd (Figure 1). Preincubation of serum from the patient with vine pollen extract or *O europaea* resulted in complete inhibition of IgE binding in Western blots. Inhibition was almost total with *L perenne* pollen and a partial inhibition was observed with *S kali* pollen. Immunoblot inhibition performed with vine pollen in the solid phase showed a total inhibition with grape and with *O europaea* and *L perenne* pollens and a partial inhibition with *S kali* (Figure 2). These results demonstrate the existence of cross-reactivity between vine pollen and grape extracts and indicate common antigenic structures between a vegetable food and other botanically unrelated pollen species.

Only a few case reports were available describing allergic reactions to grape [3-5] until Pastorello et al [6] described 14 patients allergic to grape or wine and identified and characterized the main grape allergens. The

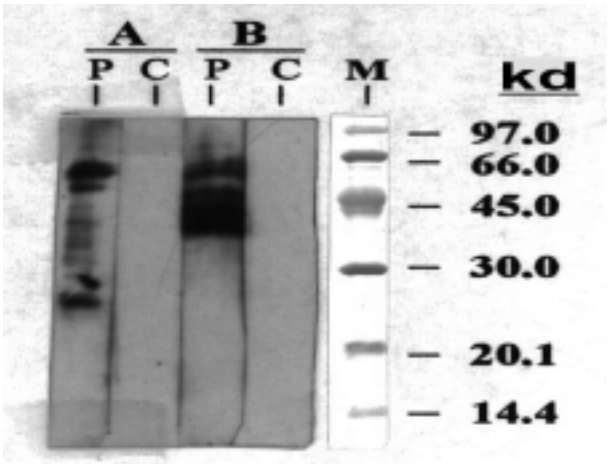

Figure 1. Immunoblot analysis with grape extract (A) and vine pollen extract (B). Lane P, patient serum; lane C, control serum (pooled from nonatopic individuals); lane M, molecular mass marker. kd indicates kilodalton.

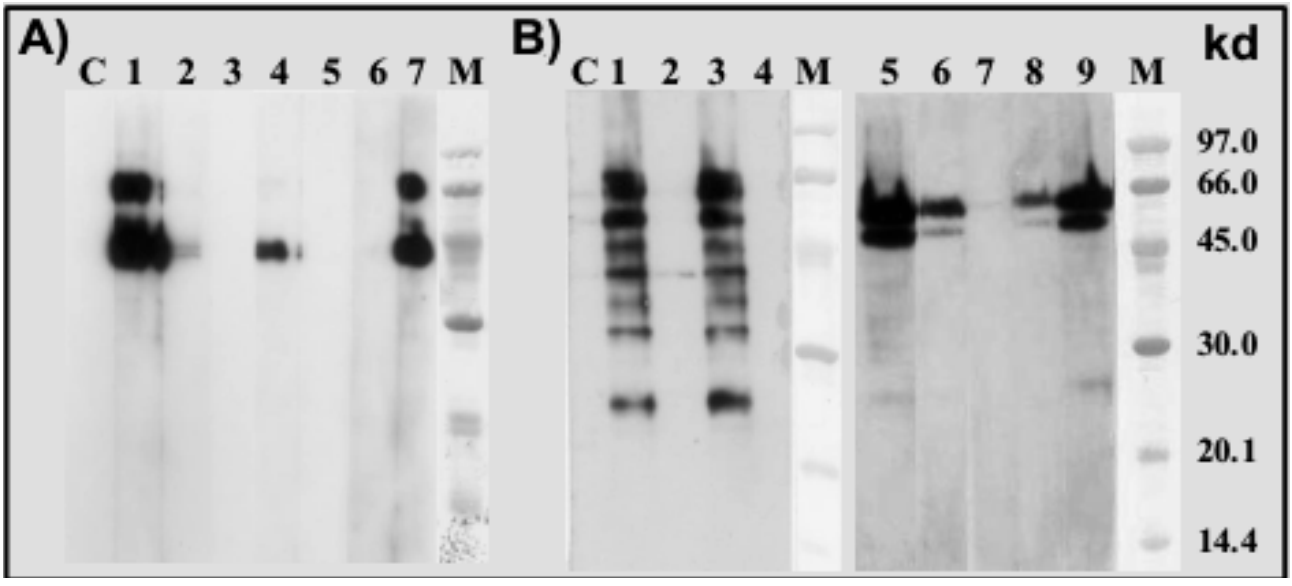

Figure 2. Immunoblot inhibition. A) Vine pollen extract as solid phase. Lane C, control serum (pooled from nonatopic individuals); lane 1, patient serum; lane 2, patient serum preincubated with vine pollen extract; lane 3, patient serum preincubated with grape extract; lane 4, patient serum preincubated with *Salsola kali* pollen extract; lane 5, patient serum preincubated with *Olea europaea* pollen extract; lane 6, patient serum preincubated with *Lolium perenne* pollen extract; lane 7, patient serum preincubated with lamb extract; M, molecular mass marker. B) Grape extract as solid phase. Lane C, control serum (pooled from nonatopic individuals); lane 1, patient serum; lane 2, patient serum preincubated with vine pollen extract; lane 3, patient serum preincubated with lamb extract; lane 4, patient serum preincubated with grape extract; lane 5, patient serum; lane 6**,** patient serum preincubated with *S kali* pollen extract; lane 7, patient serum preincubated with *O europaea* pollen extract; lane 8, patient serum preincubated with *L perenne* pollen extract; lane 9, patient serum preincubated with lamb extract; lane M, molecular mass marker.
Preincubation concentration for all extracts: 2 mg/mL. kd indicates kilodalton.

most important allergen from grape was an endochitinase 4 (30 kd protein). The other allergens described—a 9 kd lipid-transfer protein and a 24 kd thaumatin-like protein—were related to food allergy reactions to fruits, such as peach and cherry.

In our study, grape IB detected 24-30 kd allergens. However there were no low molecular weight binding proteins because our patient did not suffer from fruit allergy, despite a positive cutaneous test to cherry [7].

The clinical history and positive results to cutaneous and conjunctival tests to vine pollen extracts suggest that vine pollen was the primary sensitizer in our patient. Allergic reaction after eating grapes occurred 3 years later.

In other studies, we found that vine pollen showed 55-66 kd IgE-binding bands in 4 out of 9 patients allergic to vine pollen (unpublished data). In contrast to grape, vine pollen does not bind low molecular weight proteins. However *L perenne* and *O europaea* share the most important allergens from vine pollen, as indicated by the total inhibition in immunoblotting experiments.

Grape allergy in patients allergic to vine pollen has not been reported previously. Identification of common allergenic structures could provide an explanation for sensitivity to both vegetable substances.

Acknowledgments

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Pilar Mur Gimeno

Allergy Unit. Hospital Santa Bárbara
Malagón s/n
13500 Puertollano (Ciudad Real)
Spain
E-mail: pilarmurgimeno@saludalia.com

ERRATUM:

In: J Investig Allergol Clin Immunol 2006; Vol 16 (2): 86-93, "Effect of Probiotic Bifidobacterium longum BBS36 in relieving clinical symptoms and modulating plasma cytokine levels in japanase cedar pollinosis during the pollen season. A randomized double-blind, placebo-controlled trial."

The notation "BBS36" was incorrect. The title should be "Effect of probiotic *Bifidobacterium longum* BB536 in relieving clinical symptoms and modulating plasma cytokine levels in Japanese cedar pollinosis during the pollen season. A randomized double-blind, placebo-controlled trial."

