Allergol Immunopathol (Madr). 2014;42(5):387–394

Allergologia et immunopathologia

Sociedad Española de Inmunología Clínica, Alergología y Asma Pediátrica

www.elsevier.es/ai

ORIGINAL ARTICLE

Profilin sensitisation in a Mediterranean population

A.J. Huertas[a], A. Carreño[a], C. Mérida[a], M.J. Pajarón-Fernández[a], M. Ramírez-Hernández[a], J. Carnés[b,*]

[a] *Sección de Alergia, Complejo Hospitalario Universitario de Cartagena, Murcia, Spain*
[b] *R&D Department, Laboratorios LETI, S.L., Tres Cantos, Madrid, Spain*

Received 25 June 2013; accepted 21 September 2013
Available online 8 January 2014

KEYWORDS
Profilin;
Food allergy;
Pan-allergens;
Sensitisation;
Palm tree

Abstract
Background: Sensitisation to pan-allergens has become an interesting tool for the study of the allergenic profile of different populations. Profilins are one of the most common pan-allergens to be studied because they are responsible for a large number of sensitisations and are clearly related to cross-reactivity and co-sensitisation.
Objectives: The objective of this study was to investigate the profile of sensitisation to profilins and to correlate it with sensitisation to foods and pollens.
Methods: Six hundred and fifty-four consecutive patients were skin-prick tested with a battery of common allergens including pollens, epithelia, mites and moulds and profilin and divided into three groups depending on their sensitisation profile (non-atopic, atopic with pollinosis and atopic without pollinosis). Patients with symptoms were challenged and diagnosed with the offending food extracts. Profilin sensitisation was identified and analysed in detail.
Results: According to the classification of the population, the prevalence of profilin sensitisation was estimated at 2.9% in patients suffering respiratory allergy, 4.2% in atopic patients, and 5.9% in pollen-sensitised individuals. Positive association was observed between pollen (except *Cupressus* and olive) and profilin but not with moulds, mites or epithelia. With respect to foods, positive association was only observed between profilin and melon sensitisation. Lastly, in terms of symptoms, positive association was only observed between profilin sensitisation and OAS.
Conclusion: Profilin sensitisation seems to be a marker of pollen-related poly-sensitisation in our area. Pan-allergen diagnosis seems to be an essential tool for developing and improving selection of the correct treatment for allergic patients.

Introduction

Profilins, with a molecular weight of approximately 12–14 kDa, are ubiquitous proteins present in all eukaryotic cells and play a crucial role in regulating the activity in

* Corresponding author.
E-mail address: jcarnes@leti.com (J. Carnés).

0301-0546/$ - see front matter © 2013 SEICAP. Published by Elsevier España, S.L.U. All rights reserved.
http://dx.doi.org/10.1016/j.aller.2013.09.005

the microfilament system and intracellular calcium levels.[1] Valenta et al.[2] were the first to describe profilins as allergens, and they have now been recognised as an important family of pan-allergens,[3] responsible for cross-sensitisation and co-sensitisation among pollens and between pollens and plant-derived food due to their high degree of homology.[4] However, although profilins are also present in animals (humans included), they have only been identified as allergens in pollens and foods, probably due to the low degree of similarity and the method of exposure.[5] To date, over 30 profilins have been reported as allergens on the IUIS website,[6] in most cases identified as minor.

The use of skin prick tests containing a single purified profilin has been proposed as a diagnostic marker for profilin sensitisation.[7] The prevalence of sensitisation has been studied in different regions and countries. Studies conducted in European regions have estimated skin sensitisation to date-palm-pollen profilin (Pho d 2) to be between 12.3% and 30% in patients with pollinosis.[8–11] In vitro studies in Central Europe estimated that birch-pollen-profilin (*Bet v* 2) sensitisation is responsible for 10–20% of patients with pollen allergy.[12,13] A similar rate (21%) was described in a study of 370 individuals in Portugal,[14] and significant differences depending on geographical area were found in Spain.[9,15]

Despite high prevalence figures and the association of profilin sensitisation with other plants, the role of profilin as an allergen has long been questioned.[16] The capacity of profilins to induce respiratory symptoms has recently been demonstrated[17] and its role as an important allergen has been confirmed in patients exposed to high quantities of grass pollens.[18] Moreover, Asero et al.[8] demonstrated that over 50% of patients sensitised to profilins experienced symptoms with plant-derived foods, suggesting that profilins should be considered as a clinically relevant food allergen.[19] Most of these patients, who were allergic to food allergens and sensitised to profilins, had only mild symptoms. These symptoms generally involved oral allergy syndrome (OAS), since profilins are rapidly degraded/inactivated by the enzymes present in the digestive tract.[20,21]

The objectives of this study were: to describe the prevalence of skin sensitisation to profilin with a skin prick test consisting of profilin from date-palm pollen (Pho d 2) in patients with suspicion of respiratory allergy (rhinoconjunctivitis and/or bronchial asthma) living in the southeast of Spain; to identify the clinical profile of profilin-sensitised individuals; and to calculate the correlation between profilin sensitisation and common aeroallergens and plant-derived food-allergen sensitisation.

Materials and methods

Patient population

Six hundred and fifty-four individuals (347 females, 307 males; mean age 24.4 years, range 3–82) who attended the Allergy Service and lived on Spain's Mediterranean coast (in the area of Cartagena, Murcia) were consecutively included in the study. Only patients reporting symptoms related to respiratory allergy such as rhinitis, rhinoconjunctivitis and/or asthma were included. All enrolled patients were asked about symptoms after contact with or ingestion of plant-derived foods. Individuals reporting skin symptoms or diagnosed with drug or venom allergy were excluded.

Detailed clinical data were collected for each patient. The study was conducted with the approval of the Complejo Hospitalario Universitario de Cartagena (Murcia) ethics committee and all patients included in the study gave their oral consent.

Skin prick tests

All individuals were skin-prick tested with a battery of common biologically standardised aeroallergens (30 HEP/ml) including house-dust mites (*Dermatophagoides pteronyssinus* and *Dermatophagoides farinae*), moulds (*Alternaria alternata*, *Cladosporium herbarum* and *Aspergillus fumigatus*), epithelia (dog and cat), pollens (mixture of grasses, *Cynodon dactylon*, *Olea europaea*, *Chenopodium album*, *Salsola kali*, *Parietaria judaica*, *Artemisia vulgaris*, *Platanus acerifolia*, *Plantago lanceolada*, *Cupressus arizonica*, *Phoenix dactifera* and *Betula alba*) (Laboratorios Leti S.L., Madrid, Spain) and profilin (50 mcg/ml) from date-palm-tree pollen.

Patients reporting symptoms to food were also skin-prick tested with the offending allergen extracts.

Skin prick tests were conducted on the volar surface of the forearm, following EAACI recommendations.[22]

Epidemiological studies

In an initial epidemiological study, the total population was classified into three groups: (a) non-atopic; (b) atopic with pollinosis; and (c) atopic without pollinosis. Symptoms, pollen sensitisation and food sensitisation were determined in all the individuals. Pollen sensitisation was considered positive when wheal size to any of the pollen extracts included in the battery was $\geq 7\,mm^2$. Food-allergy sensitisation was considered positive when individuals reported symptoms after food ingestion and had a positive skin prick test ($\geq 7\,mm^2$) with the offending allergen extract.

In a second study, we focused our attention on groups b and c (atopic individuals with pollinosis and atopic individuals without pollinosis) and profilin sensitisation. Atopic sensitised individuals were subdivided into two groups according to whether the skin prick test to profilin-enriched extract was positive or not.

Statistical analysis

Statistical analyses were conducted using SigmaStat v.3.5 and SigmaPlot v.10.0 software. Proportions were analysed using contingency tables, and the non-parametric Fisher's exact probability test was applied. In all cases, a p value of ≤ 0.05 was considered statistically significant and $p \leq 0.01$ was defined as highly significant. Statistically significant results indicate a positive/significant association between the two variables considered in each case.