

Review Article

Allergen Sublingual Tablet Immunotherapy: Is It Possible to Induce nsLTPs Tolerance?

Fabiana Furci, Luisa Ricciardi*

Department of Clinical and Experimental Medicine, University of Messina, Italy

*Corresponding Author: Luisa Ricciardi, Department of Clinical and Experimental Medicine, University of Messina, University Hospital “G. Martino”, Italy

Citation: Ricciardi L (2019) Allergen Sublingual Tablet Immunotherapy: Is it Possible to Induce nsLTPs Tolerance? Int J Allergy Asthma 1: 106. DOI: 10.29011/IJAA-106.100006

Received Date: 18, November 2019; Accepted Date: 2, December 2019; Published Date: 6, December 2019

Abstract

Background: Fruit and vegetable allergies related to Non-specific Lipid Transfer Proteins (nsLTPs), are quite frequent in Mediterranean countries, with a geographical difference in sensitization. nsLTPs are major and minor allergens in various trees and weed pollens and can induce mild or severe allergic reactions.

Objective: We report our experience on 10 patients with grass respiratory pollen allergy and nsLTP sensitization. All ten patients had presented only oral symptoms after ingestion of fruit and/or vegetable known to contain nsLTPs. During the evaluation and management of these patients we investigated whether a common management of grass pollen allergy and nsLTP sensitization is possible.

Methods: All ten patients were treated with a 5 Grass pollen sublingual tablet immunotherapy and compared with 10 patients with the same sensitization and clinical pattern but who had never performed immunotherapy for pollen allergy at the time of the study.

Results

After 2 years of 5 Grass pollen sublingual tablet immunotherapy, an improvement of pollen allergy symptoms, reduced use of symptomatic drugs and major tolerance to the ingestion of nsLTPs containing foods was observed.

According to these results, we suggest that a personalized approach, investigating patients not only for respiratory allergies but also for food sensitization and the use of specific sublingual tablet immunotherapy with extracts registered as drugs, could be the right approach for a specific but at the same time comprehensive desensitization.

Keywords: Grass Pollen Allergy; Immunotherapy; Non-Specific Lipid-Transfer Proteins; Sensitization; Sublingual Tablet; Tolerance

Introduction

Non-Specific Lipid-Transfer Proteins (nsLTPs), the most prevalent plant-food allergens in Mediterranean areas, are present in many fruit and vegetables that are part of the Mediterranean diet. [1-3] Clinically LTP-allergies may present a wide range of symptoms, from local oropharyngeal symptoms up to anaphylaxis. [4-7] Severe reactions may be promoted by co-factors such as exercise, heat, alcohol intake, strong emotions and Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) which should always be

considered when investigating nsLTPs-Hypersensitive patients. [8,9] The association between nsLTP-induced anaphylaxis and pollinosis is relevant and different in the various countries; distinct pollen sensitization profiles which correlate to fruit allergies have been shown. The geographical distribution may lead to the hypothesis that a primary sensitization to specific environmental factors present in the Mediterranean area, in particular pollen sensitization, may induce sensitization to nsLTP through the airways [10].

Given that these proteins are present in both pollen and foods, there may be patients with multiple sensitization to pollen and food containing nsLTPs [11-15]. The wide spectrum of symptoms induced by food allergies and the long list of foods containing LTP

allergens can make it difficult to diagnose and manage food related LTP sensitization.

We describe our experience on patients with LTP sensitization and grass allergy, treated with 5-grass pollen sublingual tablet immunotherapy.

Methods

Ten female patients aged between 19-30 years came to our observation with a positive history for moderate persistent rhinitis (treated with antihistamines and topical nasal corticosteroids, often interrupted by the patient in absence of clinical improvement) and limited oropharyngeal symptoms (in particular itching at lip and oral mucosa and/or palate) after ingestion of fruit and vegetables which are reported to contain nsLTPs [15].

Diagnosis of allergic rhinitis, in particular to grass pollen and nsLTP sensitization was confirmed in all patients (Table 1).

Prick test
Prick to prick test
ImmunoCap specific IgE determination
Ocular and rhinitis symptom score
Allergy drug consumption

Table 1: Investigation tools.

In particular, a standard prick test for inhalant allergens was applied positive control (histamine), negative control (saline), *Dermatophagoides pteonyssinus*, *Dermatophagoides farinae*, *Alternaria tenuis*, *Aspergillus fumigatus*, *Penicillium*, *Cladosporium*, cat and dog dander, *Artemisia vulgaris*, *Cupressus*, olive, *Parietaria judaica*, birch and grass pollens such as *Dactylis glomerata*, *Anthoxanthum odoratum*, *Lolium perenne*, *Poa pratensis*, *Phleum pratense*. Prick test for fruit and vegetables was applied for peach, apple, kiwifruit, plum, strawberry, apricot, banana, wheat, zea mays, tomato, hazelnut, peanut, almond, latex. We also performed Prick-to-Prick tests with fresh fruits and vegetables which had caused symptoms.

Further confirmation of grass pollen allergy and LTP sensitization was obtained by results.

In addition, 4 out of 10 patients presented sensitization to other pollens, in particular *Parietaria judaica*, olive tree and to mites.

A 5-grass pollen (*Dactylis glomerata*, *Anthoxanthum odoratum*, *Lolium perenne*, *Poa pratensis*, *Phleum pratense*) sublingual tablet immunotherapy for the treatment of allergic rhinitis was prescribed.

The first administration took place under medical supervision in a hospital setting none of the patients had adverse reactions.

Patients were instructed to eat only fruit and vegetables containing nsLTPs but which had not caused any adverse reactions thus far. They were also instructed not to associate NSAIDs, Anti-acids, alcohol intake, and exercise to food intake.

A comparison was carried out with a control group of 10 female patients, aged between 22 to 40 years old, with allergic rhinitis and sensitization to LTP who had not undergone a 5-Grass pollen sublingual tablet immunotherapy for the treatment of allergic rhinitis. Patients were evaluated at regular intervals to assess allergic rhinitis symptoms’ and to record if they presented fruit and vegetables induced allergic symptoms.

Results

All patients treated with a 5-grass pollen sublingual tablet immunotherapy with a mixture of *Dactylis glomerata L*, *Anthoxanthum odoratum L*, *Lolium perenne L*, *Poa pratensis L*, *Phleum pratense*, taken once daily for two years experienced a significant improvement of ocular/nasal symptoms (p<0.005) and a significant reduction in the use of symptomatic drugs (in particular H1 antihistamines and nasal corticosteroids) during the pollen season; tolerance to the ingestion of nsLTPs containing fruit and vegetables (Table 2), including those which previously caused oral symptoms, occurred in all patients.

Fruits tolerated after Immunotherapy	Vegetables tolerated after Immunotherapy
Peach	Tomato
Apricot	Onion
Plum	Lettuce
Cherry	Broccoli
Apple	Spinach
Pear	Fennel
Loquat	Zea mais
Grapes	Rice
Citrus fruits	Fennel

Table 2: Fruits and vegetables tolerated after two years’ 5-grass tablet sublingual immunotherapy.

Control patients with allergic rhinitis and sensitization to nsLTPs, who did not perform 5-Grass pollen sublingual tablet immunotherapy, did not present worsening of rhinitis symptoms but showed an increase in the number of reactions after ingestion of various foods containing nsLTPs.

Discussion

Fruit and vegetable allergies are the most common food

allergies in adolescents and adults, in particular in females. Allergies mediated by LTPs can be associated with pollen sensitization, or can exist independently. According to the EAACI Guidelines on allergen immunotherapy [8] we suggest that the 5 Grass sublingual tablet immunotherapy is potentially a treatment which can increase the amount of plant food that the patient can tolerate, preventing allergic symptoms and reducing the risk of potentially life-threatening allergic reactions.

The management of nsLTP sensitization is closely related to the correct identification of the involved proteins and therefore, correct management of this kind of food allergy should be based on identification of phenotypes with underlying endotypes [1]. A personalized approach to patients with concomitant grass pollen allergy and nsLTPs sensitization, using registered allergen specific immunotherapy, such as the 5-grass pollen sublingual tablet immunotherapy, may lead to a possible tolerance through desensitization [9].

Declarations

- Ethics approval and consent to participate- Not applicable
- Consent for publication- The Authors obtained a written consent from the patient in order to perform allergic tests
- Availability of data and material: patient's data results are available
- Competing interests: The authors declare that there is no conflict of interest regarding the publication of this article
- Funding: The authors declare that this study has not received financial support.
- F.Furci and L.Ricciardi followed the patient during the clinical management and described the above reported clinical observations.
- Acknowledgements- Not applicable

Acknowledgements

The authors declare that this study has not received financial support.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

References

1. Fernandez-Rivas M (2015) Fruit and vegetable allergy. *Chem Immunol Allergy* 101:162-170.
2. Egger M, Hauser M, Mari A, Ferreira F, Gadermaier G (2010) The role of lipid transfer proteins in allergic diseases. *Curr Allergy Asthma Rep* 10: 326-335.
3. Sanchez-Monge R, Lombardero M, Garcia Selles FJ, Barber D, Salcedo G (1999) Lipid-transfer proteins are relevant allergens in fruit allergy. *J Allergy Clin Immunol* 103: 514-519.
4. Ortolani C, Ispano M, Pastorello E, Bigi A, Ansaloni R (1988) The oral allergy syndrome. *Ann allergy* 61:47-52.
5. Asero R (2011) Peach-induced contact urticaria is associated with lipid transfer protein sensitization. *Int Arch Allergy Immunol* 154: 345-348.
6. Gomez F, Aranda A, Campo P, Diaz-Perales A, Blanca-Lopez N, et al. (2014) High prevalence of lipid transfer protein sensitization in apple allergic patients with systemic symptoms. *PLoS One*
7. Mota I, Gaspar A, Benito-Garcia F, Correia M, Arêde C, et al. (2018) Anaphylaxis caused by lipid transfer proteins: an unpredictable clinical syndrome. *Allergol Immunopathol (Madr)* 46: 565-570.
8. Pajno GB, Fernandez-Rivas M, Arasi S, Roberts G, Akdis CA, et al. (2017) EAACI Guidelines on allergen immunotherapy: IgE-mediated food allergy. *Allergy* 73: 799-815.
9. Didier A, Malling HJ, Worm M, Horak F, Sussman GL (2015) Prolonged efficacy of the 300IR 5-grass pollen tablet up to 2 years after treatment cessation, as measured by a recommended daily combined score. *Clin Transl Allergy* 5: 12.
10. Asero R, Pravettoni V (2013) Anaphylaxis to plant-foods and pollen allergens in patients with lipid transfer protein syndrome. *Curr Opin Allergy Clin Immunol* 13:379-385.
11. Salcedo G, Sanchez-Monge R, Barber D, Diaz-Perales A (2007) Plant non-specific lipid transfer proteins: an interface between plant defence and human allergy. *Biochim Biophys Acta* 1771:781-791.
12. Salcedo G, Sanchez-Monge R, Diaz-Perales A, Garcia-Casado G, Barber D (2004) Plant non-specific-lipid transfer proteins as food and pollen allergenes. *Clin Exp Allergy* 34: 1336-1341.
13. Sánchez-López J, Asturias JA, Enrique E, Suárez-Cervera M, Bartra J (2011) Cupressus arizonica pollen: a new pollen involved in the lipid transfer protein syndrome? *J Investig Allergol Clin Immunol* 21:522-526.
14. Fernandez-Rivas M, Bolhaar S, Gonzalez-Mancebo E, Asero R, van Leeuwen A, et al. (2006) Apple allergy across Europe: how allergen sensitization profiles determine the clinical expression of allergies to plant foods. *J Allergy Clin Immunol* 118:481-488.
15. Breitender H, Ebner C (2000) Molecular and biochemical classification of plant-derived food allergens. *J Allergy Clin Immunol* 106: 27-36.