

Short communication

Peach allergy pattern: experience in 70 patients

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We report the clinical characteristics of peach allergy encountered in a population of peach-allergic patients. We evaluated 165 patients. The 70 peach-allergic patients were diagnosed through clinical history, the skin prick-prick test, and open oral challenge and rub tests to peach. As a pollinic control group, 95 pollen-allergic patients were also evaluated. Some 49% of the patients were male and 51% female. The mean age was 20 ± 8 years. Oral allergy syndrome (86%) was the most common symptom, followed by contact urticaria (61%) and systemic symptoms (26%). Some 67% of the patients were allergic to peach pulp, and 36% reported symptoms related to canned peach. Canned peach and pulp symptoms were statistically associated ($P < 0.01$), and symptoms to canned peach were more frequently reported by patients with systemic symptoms ($P < 0.05$). On evaluation of the peach-allergic patients' characteristics, three risk factors – allergy to peach pulp, allergy to canned peach, and peach allergy in non-pollen-allergic patients – were found, indicating development of systemic symptoms on eating peach. Most of the peach-allergic patients (81%) also had pollen allergy, which was linked to a higher prevalence of asthma (73%) than in the pollen-allergic patients of the control group (48%); this difference was statistically significant ($P < 0.01$). Finally, two groups were clearly defined by the seriousness of the peach allergy – the non-pollen-allergic patients were more predisposed to the occurrence of systemic symptoms ($> 50\%$), and the pollen-allergic patients to asthma ($> 70\%$).

Key words: asthma; canned peach; fruit; oral allergy syndrome; peach; peach allergy; pollen allergy; vegetables.

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Allergy to fresh fruits and vegetables is a common disease, and its existence has been recognized for many years (1). Unfortunately, until a few years ago, this type of allergy received little attention and was commonly underestimated.

Peach allergy is the most common form of allergy to fresh fruits in Spain (2, 3) and has been described as a relatively common cause of fresh fruit allergic reaction in Europe as a whole (4–7), as well as in the USA (8). This particular fruit sensitivity has been related to IgE-mediated allergy, and several peach antigens have been identified (9–12).

This paper aimed to report the symptom patterns discovered on studying a population of peach-allergic patients.

Material and methods

Study population

This study was carried out with patients referred to our allergy department – which is a primary referral center for all allergic patients – to have their allergic disease evaluated. The patients in this study met all of the inclusion criteria for identification of peach-allergic patients and were selected over a 12-month period.

A control group of pollen-allergic patients was included in the study so as to compare the pollen-allergy data. They were selected according to pollen-allergy criteria (typical symptoms and positive skin tests) and were also evaluated to determine whether they had peach allergy.

Excluded from the study were patients with dermatographism, as well as those in whom the use of epinephrine was contraindicated.

The patients gave their written consent to participation in the study.

Peach-allergy inclusion criteria

All of the peach-allergic patients met the following inclusion criteria: a positive clinical history of peach allergy, a positive skin test to peach (prick by prick test), and a positive challenge test (open oral challenge and/or rubbing test).

Skin prick tests

Skin tests with fresh peach (both peel and pulp) were performed in duplicate by the skin prick-prick test (SPPT), as described by Dreborg & Foucard (13). Skin prick tests (SPT) to a commercial aero-allergen battery (pollen, mites, fungi, cat, and dog) were carried out in duplicate. The pollens represented the following genera and species: five grasses – *Lolium*, *Phleum* (timothy grass), *Phragmites*, *Secale* (ryegrass), and *Cynodon* (Bermuda grass); seven weeds – *Ambrosia* (ragweed), *Chenopodium*, *Artemisia*, *Taraxacum*, *Salsola*, *Parietaria*, and *Plantago* (English plantain); and eight trees – *Betula* (birch), *Corylus*, *Olea*, *Fraxinus* (ash), *Prunus amygdalus*, *Prunus persica*, *Populus*, and *Ulmus* (elm).

The ALK-LANCET needle (ALK-LANCET, ALK, Denmark) was used for SPTs, which were performed according to EAACI guidelines (14). A result was considered positive when a wheal of ≥ 3 mm was obtained.

Challenge test

The open oral challenge tests were carried out with peeled and unpeeled fresh peach, by the method of Pastorello et al. (9), so as to demonstrate oral allergy syndrome (OAS) or systemic symptoms. For confirmation of contact urticaria (CU), the patient's forearm was rubbed with peach for 30 s and examined 15 min later (15).

The *in vivo* tests with fresh peach were carried out from June to October, which is the peach season in Spain.

Questionnaire

A careful clinical history was taken for each patient, and each was subsequently sent a questionnaire which would permit statistical management of the data. Particular attention was given to age, sex, year of the first episode, age at the first

episode, number of episodes, evolution period, and symptoms caused by canned peach (juice, jam, or peach in syrup). We also asked for data on patient pollen allergy, such as allergic respiratory symptoms (rhinitis or asthma), year of the first episode, age at the first episode, and evolution period.

Statistical methods

Quantitative data differences between patient groups were analyzed with the Mann-Whitney test. The chi-square test was used for 2x2 contingency tables. For all comparisons, statistical significance was considered to be present at $P < 0.05$.

Results

A total of 165 patients were evaluated; 70 peach-allergic patients and 95 pollen-allergic patients as a control group. Of the 95 pollen-allergic control patients, 12 also met the peach-allergy criteria.

Age and sex

Some 34 of the 70 peach-allergic patients were male and 36 female. The mean age was 20 ± 8 years, ranging from 4 to 43 years. The mean age of patients on beginning to suffer peach allergy symptoms was 12 ± 7 years, varying from 1 to 28 years; the time gap median from the beginning of the peach allergy to the initiation of this study was 5 years.

Peel and pulp allergy

All of the peach-allergic patients had symptoms to unpeeled peach and positive SPPTs to peach peel. The open oral challenge test was positive in 60 patients; the remaining 10 patients required the rub test to determine diagnosis. Fourteen patients rejected the oral challenge test to peeled peach (peach pulp); however, this was positive in 38 of the 56 remaining patients (68%). SPPTs to pulp were positive in 100% of the pulp-allergic patients and also in 15 of the 18 non-pulp-allergic patients.

Peach-allergy symptoms

Symptoms produced by peach were OAS in 86% of the patients, CU in 61%, and systemic symptoms in 26% (Fig. 1). Of the patients who reported OAS, 57% also had CU; 29%, systemic symptoms; and 16%, both. Characteristics of patients with systemic symptoms are shown in Table 1; these were urticaria in 16 cases, angioedema in 13, gastrointestinal symptoms in seven, dyspnea in three, and hypotension in two.

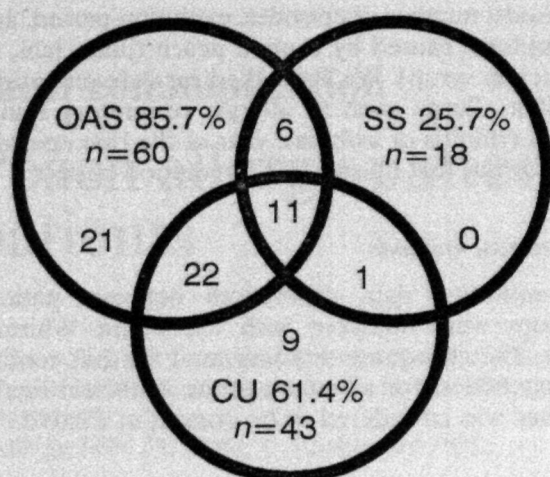


Fig. 1. Allergic symptoms caused by peach. OAS: oral allergy syndrome; CU: contact urticaria; SS: systemic symptoms.

In all cases, the local symptoms (OAS and CU) began immediately; systemic symptoms always occurred within the first 30 min after exposure to peach and were preceded by OAS in most of the patients (94%). The patients who had experienced only local symptoms reported frequent peach symptom episodes; however, these were difficult to quantify. On the other hand, when the patients had experienced systemic symptoms, they avoided eating peaches; the number of episodes then became fewer, depending on the seriousness of the reaction (urticaria, hypotension, etc.).

Patients reporting systemic symptoms had peach-pulp allergy (14/17: 82%) more frequently than patients with only local symptoms to peach (24/39: 61%); this difference almost reached statistical significance ($P < 0.1$).

Canned peach products and peach allergy

Some 57 patients had sometimes eaten canned peach products. On evaluating the symptoms produced by these products, it was found that 37% of these patients had symptoms to peach juice, 28% to peach in syrup, and 24% to jam. These percentages were higher in the juice-allergic subgroup – jam symptoms in 14 of the 18 patients and peach in syrup symptoms in 11.

Some 50% of the peach-pulp-allergic patients reported having had symptoms on drinking peach juice; this was reported by only 6% of the non-pulp-allergic patients ($P < 0.001$). There was a statistical association between having juice symptoms and peach-pulp allergy ($P < 0.001$). Juice symptoms among the patients with systemic symptoms (9/16: 56%) were more frequent than among those with only local symptoms (12/38: 32%; $P < 0.05$).

Table 1. Characteristics of patients with systemic symptoms

Age (years)	Sex	Pulp allergy	Local symptoms	Systemic symptoms	Pollen symptoms	CPS
33	F	No	OAS	U, AE	No	No
9	M	Yes	OAS, CU	U, GIS	R, A	No
28	F	Yes	OAS, CU	U, AE, R, GIS, H	R, A	Yes
18	F	Yes	OAS	AE	R	No
26	F	Yes	OAS, CU	U, D, R	R, A	No
28	M	Yes	OAS, CU	U	R, A	Yes
10	F	Yes	OAS, CU	AE	No	Yes
31	F	Yes	OAS, CU	U, AE, GIS, D, H	No	No
25	F	Yes	OAS	U, AE, GIS	R, A	Yes
27	F	Yes	OAS, CU	U, AE	R, A	Yes
20	F	No	OAS	U, AE, D	No	No
28	M	Yes	OAS	U, AE, R	R, A	–
16	F	–	OAS, CU	U, AE	R	No
4	M	Yes	OAS, CU	U	No	Yes
16	M	No	–	U, AE	R, A	No
9	F	Yes	OAS	U, AE, GIS	No	Yes
16	M	Yes	OAS, CU	U, GIS	R	Yes
43	F	Yes	OAS, CU	U, AE, R, A, GIS	R, A	Yes

A: asthma, AE: angioedema, CPS: canned peach symptoms, CU: contact urticaria, D: dyspnea, GIS: gastrointestinal symptoms, H: hypotension, OAS: oral allergy syndrome, R: rhinitis, U: urticaria.

Pollinosis and peach allergy

Of the 70 peach-allergic patients, 60 (86%) had an allergic respiratory disease. Most of these (57 of the 60 patients: 95%) were allergic to pollen, and 25 patients (42%) were also sensitized to other aeroallergens – 11 to mites (18%), 18 to cat (30%), 17 to dog (28%), and seven to fungi (12%). The results of the pollen skin tests showed a statistically significant association between peach allergy and most tree and weed pollens, except *Olea*, *Parietaria*, and *Plantago*.

The pollen- and peach-allergic patients reported rhinitis symptoms in 15 cases (27%) and rhinitis/asthma in 42 (73%), while 49 patients (52%) reported rhinitis and 46 asthma (48%) in the pollen-allergic control group. This prevalence of asthma among pollinic patients allergic to peach was higher than that observed in the pollinic control group ($P < 0.01$).

When evaluating the first allergy – to peach or to pollen – reported by the peach- and pollen-allergic patients, we found that symptoms of pollen allergy were the first to appear in 49.1%, symptoms to peach in 35%, and symptoms to peach and pollen, beginning in the same year, in 16%.

Only 13 (19%) peach-allergic patients had no pollen allergy; nine of these 13 non-pollen-allergic patients were female (69%). The peach symptoms in non-pollen-allergic patients evidenced a high frequency of systemic symptoms (54%). Of patients reporting systemic symptoms, 4/6 (67%) were pulp-allergic, while none of the three patients

reporting local symptoms were allergic to peach pulp.

Discussion

This study was carried out in 70 peach-allergic patients in order to determine the clinical characteristics of peach allergy in peach-allergic patients. The peach-allergic patients were diagnosed by clinical history, SPPTs, and challenge test to peach. Although the double-blinded challenge test is considered the "gold standard" for the diagnosis of food allergy (16–18), the blindness of a provocation test in this syndrome raises many problems, as summarized by Ortolani et al. (7).

Most of the peach-allergic patients (78%) in our study were 10–30 years of age; most of them, however, had begun to have peach symptoms during the first 20 years of life. It is of note that at least 50% of the peach-allergic patients had had peach allergy for more than 5 years.

Some reports on allergy to fresh fruits and nuts (4, 6, 19) found a predominance of female patients, while others have not. Our peach-allergic patients did not show any difference in sex.

All of the 70 patients were allergic to unpeeled peach, and 61% of the patients also had peach-pulp allergy. The results of the SPPTs to peach pulp showed so many false-positive results (83%) and bad specificity (17%) that these cannot be considered a good predictive test for diagnosing pulp allergy in peach-allergic patients. However, the high sensitivity (100%) of the pulp SPPTs in the detection of pulp allergy is sufficient – when the tests are negative – to exclude the diagnosis of peach-pulp allergy in peach-allergic patients. For the purpose of calculating these data for peach-pulp skin tests, we considered non-pulp-allergic patients as the nondisease group.

In our study, the symptom most often caused by peach was OAS, the next most common symptom being CU. The proportion of patients reporting OAS to peach (86%) was similar to that found by Ortolani et al. (4). In this context, we should remark that this high frequency of CU in peach-allergic patients has not been reported in relation to other fresh fruits; therefore, 14% of peach-allergic patients had CU with no OAS or systemic symptoms.

Allergy to fresh fruits and vegetables has been associated with pollen allergy in several studies (4, 8, 20–24); our results on peach allergy agree with those studies, as 81.4% of the peach-allergic patients also had pollen allergy. Birch or ragweed pollen allergy particularly seems to favor sensitization to fresh fruits (8, 20, 23). We found a statistical association between peach allergy and sensitization

to several weed and tree pollens, but, curiously, it also existed with birch or ragweed pollens, which are rare in our geographic area (central Spain). Moreover, the allergic respiratory disease experienced by the peach-allergic patients was more severe than that observed in the control group of pollen-allergic patients. This higher frequency of asthma has also been reported in relation to other fruits (8, 19).

As many as 25% of the peach-allergic patients had systemic symptoms on eating peach, varying from urticaria to hypotension. Allergy to peach pulp, allergy to canned peach, and peach allergy in non-pollen-allergic patients were more frequent in peach-allergic patients who had had systemic symptoms; accordingly, these can be considered risk factors for experiencing systemic symptoms on eating peaches.

Our study points up the association between canned peach and peeled peach symptoms and the occurrence of systemic symptoms. The marked lability of allergens of fresh fruit has been previously reported (7), but the data included herein suggest that a peach antigen may exist that can resist both oxidation phenols and heat action; this would probably be related to the occurrence of systemic symptoms.

Peach-allergic patients who have only local symptoms usually do not consider this condition a serious disease, for they often continue to eat peaches. The seriousness of this allergy is based on the fact that 25% of these patients have systemic symptoms, and the associated allergic respiratory disease is more severe, with a higher prevalence of asthma. In this context, we can define the seriousness of peach-allergic patients as being based on the patient's having, or not having, a pollen-allergic disease; non-pollen-allergic patients are more predisposed to experiencing systemic symptoms (>50%), and pollen-allergic patients to asthma (>70%).

We are reporting data which will aid a better understanding of peach allergy and peach-allergic patients; however, we wish to make clear that there are still many problems to be resolved concerning both peach and other fruit allergies, problems which can be dealt with only in future studies.

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