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Case Report

Jackfruit Allergy – An Increasing Exotic Problem Linked to the Oral Allergy Syndrome

Bansal RA, Patel P, Sanghvi MM and Bansal AS*
Department of Immunology and Allergy, St Helier Hospital, Carshalton, Surrey, England

***Corresponding author:** Amolak S Bansal, Department of Immunology and Allergy, St Helier Hospital, Carshalton, Surrey, England

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Abstract

Jackfruit allergy is extremely rare and previous reports have been restricted to patients with Silver birch pollen related oral allergy syndrome. We report five cases of people from the Indian subcontinent residing in the UK who developed jack fruit allergy on a background of the oral allergy syndrome. Skin testing with the raw jackfruit was confirmatory but blood tests were mixed in their positivity. In patients suspected to be allergic to jackfruit we suggest skin testing is undertaken as blood tests may be negative. European patients with birch pollen related oral allergy syndrome travelling to Asia are at risk of significant allergic symptoms on eating jackfruit.

Keywords: Jackfruit; Allergy; Oral allergy syndrome; Skin testing

Introduction

Jackfruit (Artocarpus heterophyllus), otherwise known as breadfruit, is a member of the mulberry family. Allergic reactivity to jackfruit has only rarely been reported [1]. We describe five cases of jackfruit allergy in people of Asian origin evident several years after their migration to the UK. All the patients had a long history of Seasonal Allergic Rhinitis (SAR) and allergic reactivity to fresh fruit such as apples and peaches as part of an Oral Allergy Syndrome (OAS). Skin testing with the raw jackfruit was confirmatory but blood tests in all but two of the cases were negative.

Case Presentations

Outline details of five patients with jackfruit allergy are provided below. The critical details of the symptoms surrounding allergic reaction to jackfruit, symptoms indicative of Oral Allergy Syndrome (OAS) and the blood and skin prick testing results are all provided in Table 1.

Case 1

A 49-year-old woman of Indian origin developed features of a systemic allergic reaction within 2 minutes of consuming roughly 10gms of fresh jackfruit. Emergency treatment with anti-histamines, hydrocortisone and adrenaline was used by the ambulance crew and she had improved significantly on reaching hospital. Despite an allergic reaction to fresh apple 6 years previously, she was still able to tolerate commercial long life apple juice and there were no other fruit sensitivities. She had moderate asthma and there was no indication of latex or kiwi fruit allergy.

Case 2

A 46-year-old woman from Sri Lanka with SAR developed a moderate localized allergic reaction within 2 minutes of eating 5 grams of fresh jackfruit, which was improved with taking antihistamine.

Case 3

A 45-year-old woman of South Asian origin developed a localised allergic reaction limited to her airways, which began as severe nasal blockage, within a few minutes of eating a few slices of freshly prepared jackfruit. Her symptoms were resistant to treatment with oral antihistamines and steroid nasal spray, and she eventually required hospital admission for parenteral adrenaline and steroids. During her childhood she had eaten jackfruit without suffering any allergic symptoms. She had a long history of SAR.

Case 4

A 47-year-old woman of Indian origin with asthma, SAR, hypertension and hyperlipidaemia presented with a 1-year history of oral itching on eating fresh apple. There was also oral itching after the ingestion of fresh jackfruit and a mild reaction after eating fresh celery. She had never previously reacted to any of the common nuts nor did she have any evidence of latex sensitivity.

Case 5

A 53-year-old gentleman of Sri Lankan origin developed a severe allergic reaction within 20 minutes of eating fresh jackfruit.

Figure 1: Photograph of skin prick testing carried out with Patient 5. (+: Positive Control; - : Negative Control; R: Raw Jackfruit; T: Tinned Jackfruit; Tree: Commercial Tree Mix Allergen)

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Table 1: Summary table of all cases.

Case Number	Age (years)	Sex	Symptoms with fresh jackfruit ingestion	Symptoms of oral allergy syndrome	Skin Prick Testing Results	Blood Results
1	49	Female	Throat and eye itching, throat constriction, dysphagia and difficulty talking within 2 minutes.	Rhinitis in the spring/summer months.Episode of throat itching, chest tightness and dysphagia after eating fresh apple, 6 years ago.	25mm wheal to mid blooming tree pollen (containing silver birch pollen). 18mm wheal to fresh apple. 12mm wheal with jackfruit and cherry. 3mm wheal to mixed grass pollen. Negative result to other pollens plus almond, walnut, hazelnut, Brazil nut, cashew, lupin flour and a commercial apple and potato reagent.	Total IgE: 312 kU/L; Specific IgE to jackfruit: <0.1 kUA/L
2	46	Female	Lip swelling and nausea within 2 minutes.	Symptoms of oral itching and dysphagia after eating fresh apples, peaches, plums and hazelnuts, which began 5 years ago.	8mm wheal to fresh jackfruit and silver birch pollen. 7mm wheal to fresh apple, 6mm wheal to peach and hazel nut. 4mm wheal to almond and grass pollen. Negative result with peanut, walnut, Brazil nut and cashews.	Total IgE: 89 kU/L; Specific IgE to jackfruit: <0.1 kUA/L
3	45	Female	Severe nasal blockage, tongue swelling and difficulty speaking within a few minutes.	Rhinitis and eye itching for the previous 20 years, typically affecting her in the months of February/March and eased in the summer months.	6mm wheal to fresh jackfruit.	Total IgE: 43 kU/L; Specific IgE to jackfruit: <0.1 kUA/L
4	47	Female	Oral itching only.	1-year history of oral itching following the consumption of fresh apple. Unaffected by ingestion of cooked apple. Later episode of oral itching, shortness of breath, wheezing and facial swelling after eating fresh pear. Hayfever symptoms, which are worse in the spring and less in the summer.	NOT PERFORMED.	Total IgE: 58kU/L; Specific IgE to jackfruit: 2.78 kUA/L
5	53	Male	Eye, tongue and facial swelling and difficulty breathing within 20 minutes.	12-year history of hayfever symptoms, which are maximal in late summer/ beginning of autumn, and which have lessened over time. Oral itching and mouth swelling following ingestion of fresh apple/peach which started 10 years ago, which has since led to him completely avoiding apples/peach/plums.	9mm wheal to raw jackfruit and 14mm wheal to tree allergen mix (including silver birch). Negative result with tinned jackfruit.	Total IgE: 82 kU/L; Specific IgE to jackfruit: 0.39 kUA/L

He had moved to the UK when he was 28 and he had frequently eaten jackfruit as a younger man in Sri Lanka. Tinned jackfruit was consumed without any allergic symptoms. He had suffered seasonal allergic rhinitis for 12 years, which had improved over the years. For the previous 10 years he had developed oral itching and mouth swelling after eating fresh apple, peach and plums.

Skin prick testing (**Figure 1**) confirmed positive results for raw jackfruit (labeled 'R') with a wheal of 9 mm and a tree pollen mix (labelled 'Tree') containing silver birch pollen with a 14mm wheal. The results for tinned jackfruit was negative (marked 'T'). The specific IgE to the BetV1 PR10 allergen was positive at 9.12 kUA/l, and the specific IgE level to the common silver birch allergen was also raised at 19 kUA/l.

We assessed cross reactivity between the patient's specific IgE to jack fruit and that to silver birch pollen, which underlies the oral allergy syndrome. This involved mixing and incubating 150 microlitres of the patient's serum with 5 microlitres of either commercial silver birch pollen skin testing reagent or phosphate buffered saline. The results showed a total IgE of 82 kU/L and an initial positive specific IgE to jackfruit 0.39 kUA/L. The latter was reduced to undetectable levels (0.03 kUA/L) after incubation with the silver birch pollen. This strongly suggested cross reactivity between the two allergens as adding the silver birch pollen extract to the serum of patients with house dust mite reactivity showed no inhibition in four patients.

Discussion

Birch pollen related Oral Allergy Syndrome (OAS) causes oral itching with fresh fruit and vegetables and with a low possibility of systemic symptoms [2,3]. All of our patients originated from the Indian subcontinent and had settled in the UK over ten years previously. They had all suffered seasonal allergic rhinitis, particularly in the spring, that affected their eyes and nose. After five to six years they had initially developed oral mucosa-limited immediate reactivity to raw but not cooked apples and peaches and had subsequently avoided fruit of the Rosacaea family with no symptoms. All but one had developed oral itching, dysphagia, and facial swelling following the ingestion of raw jackfruit (the remaining patient did not have an acute episode of systemic reactivity to jackfruit, but reported oral itching following ingestion).

Allergy to Jackfruit is very likely to increase in Europe owing to two important factors. Firstly it contains proteins that cross react

with the silver birch BetV1 protein [4,5] that underlies the OAS. Consequently patients with OAS have a significantly increased prevalence of oral symptoms on consuming jackfruit [4]. Secondly there is increased consumption of this exotic fruit in the UK and in Europe. In the countries from whence jackfruit originates the prevalence of allergic reactivity is unknown but likely very rare. It is possible that this relates to the rarity of the silver birch tree and thus OAS in these countries. There are no reports on this issue in the published literature.

Jackfruit allergy is likely to increase in Western countries owing to the increasing export of this fruit by Asian, African and Caribbean countries and global migration trends. Physicians should be aware that most cases are related to the oral allergy syndrome and blood tests may be negative while skin tests with the raw fruit are positive. While jack fruit allergy is extremely unlikely to occur in people who remain resident in Asia it is possible that it may occur in people who return to Asia having resided in Europe and developed Silver birch pollen allergic rhinitis and the oral allergy syndrome.

Authors Contributions

ASB saw the patients, managed them clinically and drafted the report. RAB and MMS did the literature search and helped write the report. PP performed all the laboratory testing for the specific and total IgE results.

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