

Jackfruit anaphylaxis in a latex allergic patient

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Summary

Several fruits have been reported to cross-react with latex antigen in latex allergy patients but little is known regarding tropical fruits in particular. Here we report the case of a 34-year-old nurse who developed anaphylaxis following the ingestion of dried jackfruit (*Artocarpus heterophyllus*). The patient had a history of chronic eczema on both hands resulting from a regular wear of latex gloves. She and her family also had a history of atopy (allergic rhinitis and/or atopic dermatitis). The results of skin prick tests were positive for jackfruit, latex glove, kiwi and papaya, but the test was negative for banana. While we are reporting the first case of jackfruit anaphylaxis, further research needs to be conducted to identify the mechanisms underlying it. In particular, in-vitro studies need to be designed to understand if the anaphylaxis we describe is due to a cross reactivity between latex and jackfruit or a coincidence of allergy to these 2 antigens. (*Asian Pac J Allergy Immunol* 2015;33:65-8)

Keywords: Jackfruit, anaphylaxis, cross-reactivity, latex allergy, latex-fruit syndrome

Introduction

Latex allergy, when compared to the general population, is more common among health care workers and atopic patients.¹ Several fruits have been found to cross-react with latex and may be associated with anaphylaxis² but only a few of reported fruits are tropical fruits, such as banana, papaya, and fig.³

Jackfruit (*Artocarpus heterophyllus* Lam.), a tropical fruit belonging to the Moraceae family, is the largest known edible fruit.⁴ Although jackfruit is widely consumed in Southeast Asia and India⁴, only a few cases of hypersensitivity from ingestion of jackfruit have been reported in the literature.⁵⁻⁶ Moreover, as far as we know, there is no other report of anaphylaxis associated with jackfruit consumption. Here we report a patient with a history of latex allergy presented with anaphylaxis following ingestion of dried jackfruit.

Case Presentation

A 34-year-old Thai female nurse presented with chest discomfort, cough, dyspnea, facial angioedema and urticaria 15 minutes after ingestion of ten pieces of dried jackfruit. She did not experience any symptoms of nausea, vomiting or diarrhea. On arrival, her body temperature was 36.8°C, blood pressure was 131/83 mm Hg, pulse rate was 89 per minute, and respiratory rate was 20 per minute. Physical examination revealed facial angioedema, urticaria on both hands and wheezing. The diagnosis of anaphylaxis was made and she was treated with antihistamine and corticosteroid parenterally, and was admitted to the hospital.

For one year, the patient had been having pruritic rashes at both hands whenever they came in contact with latex. Later, the rash developed into chronic eczema. She worked as a nurse for two years and had to use latex gloves frequently in the exercise of her profession. She had underlying long-term allergic rhinitis and atopic dermatitis, and her brother also had allergic rhinitis. As a child, the patient was used to consume fresh jackfruit, papaya, banana and kiwi without any allergic reaction, but she had never ingested dried jackfruit before. Her previous skin prick test was positive for house dust mite.

At the emergency room, she was treated intramuscularly with adrenaline and antihistamine. While her symptoms improved within 3 hours, she was admitted to ensure the improvement of her symptoms and to be observed for late phase

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reaction. After one day of hospitalization, she was discharged with a prescription of oral antihistamine and a self-injected adrenaline kit.

Few weeks later, skin prick tests were done for fresh jackfruit, dried jackfruit, banana, papaya, kiwi, two brands of latex gloves, latex glove brand #2 post-sterilized, sterile gloves and vinyl gloves. Briefly antigen preparation was made as follow: all fresh fruits were tested via a prick-to-prick method. For the dried jackfruit test, a small piece of approximately 1 cm². was grinded, dissolved in 2 ml of normal saline, and was further diluted to 1:100 with normal saline. The latex glove antigen extract was prepared based on the method described by Crippa M et al. 2003.⁷ Wheal diameter and flare were measured after 15 minutes. The result is considered positive if the wheal diameter is greater than 3 mm, together with flare. Histamine was used as positive control. The definition of positive scores are as follow: 4+ =when the wheal diameter is at least comparable to that of histamine reaction but also with pseudopod(s); 3+ =when the wheal diameter is approximately 5 mm or comparable to the histamine reaction; 2+ =when the wheal diameter is >4 to <5 mm; and 1+ is when the wheal diameter is >3 to ≤ 4 mm. Skin prick tests were positive for dried jackfruit (4+), fresh jackfruit (4+), papaya (3+), kiwi (2+), latex glove brand #1 (1-2+) and latex glove brand #2 (4+) and were negative for banana, sterile and vinyl gloves. Latex glove brand #2 induced a much larger skin reaction than brand #1. Noteworthy, when the same highly allergenic reactive latex glove (latex glove brand #2) was autoclaved and the extract was prepared for the skin prick test, the result became negative. Skin prick tests in a healthy subject without a history of atopy or latex allergy was tested as a negative control (normal saline) and showed no skin reactions to the above-mentioned antigens.

For precaution, the patient was advised to avoid exposure of any latex products, jackfruit, papaya, and kiwi. Nevertheless, her atopic dermatitis and allergic rhinitis persisted due to the unavoidable occasional exposure to latex. As a consequence, the patient was transferred from the inpatient ward to the patient relationship unit. Although her overall symptoms significantly improved after her transfer, a med-alert card and pre-filled adrenaline kit for self-injection while encountering anaphylactic attack was recommended.

Discussion

We reported a case of a patient with a history of latex glove hypersensitivity and experienced anaphylaxis following the ingestion of dried jackfruit. Skin prick tests were strongly positive for jackfruit (both fresh and dried) and latex glove. Based on the clinical history complemented with skin prick tests, the patient was shown to have latex and jackfruit hypersensitivity. The patient longitudinal clinical history showed that approximately one year after her diagnosis of latex allergy, she had two episodes of serious life-threatening reactions: once to dried jackfruit (the presently reported episode), and later on to ripe papaya (but not to raw papaya). Noteworthy, she was used to consume both jackfruit and papaya without any reaction which fact let us conclude that the present case is a jackfruit anaphylaxis on a patient having latex allergy. Although *in vitro* cross reaction by RAST inhibition or immunoblotting inhibition is warranted to confirm this diagnosis, our analysis suggests, from a clinical perspective, that a cross-reaction between latex and jackfruit is likely to be the cause of the observed reaction.

In general, chronic eczema from latex, considered as allergic contact dermatitis, is type IV hypersensitivity, while Jackfruit anaphylaxis is categorized as type I hypersensitivity. It is unusual that these two reactions can be caused by the same epitope(s). However, Guimaraens et al. (1992)⁸ reported a case of a 71-year-old patient with a history of chronic eczema on both hands and feet, with a sensitization to rubber compound, developed anaphylaxis after insertion of a Foley catheter.

Fig (*Ficus benjamina*) and jackfruit are in the same plant family, Moraceae. In 1998, Diez-Gomez et al. reported a case of cross-reactivity between latex, papain and fig, confirmed by inhibition assays.⁹ More recently, in 2012, Hemmer et al.¹⁰ demonstrated that Bet v 1-related allergens can be the potential cause of cross-reactivity in fig and other Moraceae fruits, including jackfruit.

The term "latex-fruit syndrome" was proposed in 1994 by Blanco et al.⁵ when they reported the clinical evidence that 52% of the latex allergic patients showed immediate hypersensitivity to chestnut, avocado, banana, kiwi, or papaya. Subsequently, a number of publications showed cross-reactivity between fruits and latex (Table 1).

The allergen responsible for the latex-fruit syndrome is the N-terminal domain of class I chitinases found in these fruits which cross-react with the major latex allergen, hevein.²

We also performed skin prick tests with papaya, kiwi and banana. The results were positive for papaya and kiwi, and negative for banana. A positive skin prick test had 80% concordance with the clinical diagnosis, and therefore it has become the best diagnostic test currently available in order to corroborate the diagnosis of latex-fruit allergy.³

Of note, skin prick test results have also shown that there is a markedly different allergenicity between different brands of latex gloves, i.e., brand #2 induced a much larger wheal and flare as compared to brand #1.

In addition, as a health care provider, the patient has a significant risk for acquiring latex allergy². She also has atopic dermatitis and allergic rhinitis with a strong family history of atopy. The risk of latex allergy among individuals who have atopy is 4 times higher than non-atopic individuals.¹⁹ She

Table 1. Fruits and vegetables that have been reported to cross-react with latex.

Fruit and Vegetable	Scientific name	Year of Publication	Reference number
Azufaifa (Chinese date)	<i>Ziziphus jujuba</i>	2002	11
Apple	<i>Malus domestica</i>	1999, 2000	12, 2
Apricot	<i>Prunus armeniaca</i>	1999	12
Avocado	<i>Persea americana</i>	1994, 1995, 1999, 2000	3, 12, 2
Banana	<i>Musa acuminata</i>	1994, 1995, 1999, 2000	3, 12, 2
Bell Pepper	<i>Capsicum annuum</i>	2004	13
Carrot	<i>Daucus carota</i>	1999	12
Coconut	<i>Cocos nucifera</i>	1999, 2000	12, 2
Cherry	<i>Prunus avium</i>	1999, 2000	12, 2
Cassava (Manioc)	<i>Manihot esculenta</i>	2007	14
Chestnut	<i>Castanea dentate</i>	1994, 1999, 2000	3, 11, 2
Celery	<i>Apium graveolens</i>	2001	15
Cucumber	<i>Cucumis sativus</i>	2011	16
Fig	<i>Ficus carica</i>	1994, 1998, 2000, 2010	3, 9, 2, 10
Grape	<i>Genus Vitis</i>	2000	2
Guava	<i>Psidium Guajava</i>	2000	2
Indian Jujube	<i>Zizyphus mauritiana</i>	2004	17
Kiwi	<i>Apteryx australis</i>	1994, 1999, 1999, 2000	3, 12, 2
Loquat	<i>Eriobotrya japonica</i>	1999, 2000	12, 2
Melon	<i>Cucumis melo</i>	2000	2
Mango	<i>Mangifera indica</i>	2000	2
Nectarine	<i>Prunus persica var. nectarina</i>	1996	18
Pear	<i>Pyrus communis</i>	1995, 2000	2
Peach	<i>Prunus persica</i>	1996, 2000	18, 2
Passion fruit	<i>Passiflora edulis</i>	2000	2
Pineapple	<i>Ananas comosus</i>	2000	2
Potato	<i>Solanum tuberosum</i>	2000	2
Plum	<i>prunus domestica</i>	1996	18
Papaya	<i>Carica papaya</i>	1994, 2000	3, 2
Strawberry	<i>Fragaria ananassa</i>	1999, 2000	12, 2
Tomato	<i>Solanum lycopersicum</i>	1999, 2000	12, 2
Watermelon	<i>Citrullus lanatus</i>	1999	12

developed chronic eczema on both hands one year after starting working as a nurse. The prevalence of latex allergy in healthcare providers is approximately 4%⁵ compared to less than 1-2% in the general population.² She was advised to avoid re-exposure by using non-latex gloves and to avoid other latex products. In addition to personal avoidance, the term “Latex safe environment”²⁰ has been promoted recently for the management of latex allergy in hospital settings. The implementation of this campaign is however difficult in Thailand and other more resource-limited settings.

In conclusion, we reported on a latex allergic nurse with a history of jackfruit-induced anaphylaxis. The clinical history and skin prick tests results suggest that jackfruit should be listed among other previously reported fruits that can cause clinical symptoms due to a cross-reaction in patients with latex allergy. Such cross-reaction can lead to a life-threatening anaphylaxis. Complementary *in vitro* studies are warranted to confirm the cross-reactivity and to identify the cross-reactive epitope(s).

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Conflict of interests

All authors declare of no conflicts of interest.

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