



Contents lists available at ScienceDirect

Respiratory Medicine Case Reports

journal homepage: <http://www.elsevier.com/locate/rmcr>

Oral mite anaphylaxis after ingestion of Korean pancake

Seitaro Senba^a, Takao Tsuji^{b,c,*}, Ryota Kikuchi^b, Yuki Iwai^a, Junichiro Kawagoe^a, Hirouki Nakamura^a, Kazutetsu Aoshiba^a^a Department of Respiratory Medicine, Tokyo Medical University Ibaraki Medical Center, 3-20-1 Chuou, Ami, Inashiki, Ibaraki, 300-0395, Japan^b Department of Respiratory Medicine, Tokyo Medical University, 6-7-1 Nishishinjuku, Shinjyuku-ku, Tokyo, 160-0023, Japan^c Department of Respiratory Medicine, Institute of Geriatrics, Tokyo Women's Medical University, 2-15-1 Shibuya, Shibuya-ku, Tokyo, 150-0002, Japan

ARTICLE INFO

Keywords:

Oral mite anaphylaxis (OMA)
Wheat flour
Refrigerator
Risk factor

ABSTRACT

Background: Oral mite anaphylaxis (OMA) is a syndrome characterized by severe allergic manifestations occurring in atopic patients shortly after the intake of foods made with mite-contaminated wheat flour. A history of atopic disease has been identified as one of risk factors for the development of OMA. This is the report that OMA was induced by the ingestion of Korean pancake prepared with commercial mixed wheat flour contaminated with mites.

Case presentation: A 15-year-old Japanese girl with a history of atopic asthma and dermatitis was admitted to the emergency department with the anaphylactic symptoms of urticaria, skin flushing, throat discomfort, acute dyspnea and severe wheezing that developed shortly after the ingestion of home-cooked buchimgae (Korean pancake) prepared with commercial mixed wheat flour. The ingredients in the buchimgae were eggs, shrimps and chopped Chinese chives, but the girl had previously consumed these individual ingredients without incident. Microscopic examination of the mixed wheat flour revealed the presence of large numbers of live dust mites. The patient's serum specific IgE analysis was positive for antibodies to dust mite allergens. From these findings, the anaphylactic episode in this patient was concluded to be the result of ingestion of mixed wheat flour contaminated with mites.

Conclusions: OMA was induced by the ingestion of wheat flour contaminated with mites. Physicians should be aware of this clinical picture, particularly in the case with risk factors, and recommend that wheat flour should be stored in a refrigerator to prevent mite proliferation and the development of OMA.

1. Background

Oral mite anaphylaxis (OMA), also known as pancake syndrome, is a syndrome characterized by severe allergic manifestations occurring shortly after the intake of foods made with mite-contaminated wheat flour. A history of atopic disease and non-steroidal anti-inflammatory drug (NSAID) hypersensitivity have been identified as risk factors for the development of OMA.

2. Case presentation

A 15-year-old Japanese girl was admitted to an emergency department with the anaphylactic symptoms of urticaria, skin flushing, throat discomfort, acute dyspnea and severe wheezing that developed shortly

after the ingestion of home-cooked buchimgae (Korean pancake) prepared with mixed wheat flour (ingredients: wheat flour, potato flour, sea salt, beef powder), which had been stored in a plastic container at ambient temperature for several weeks after opening. The ingredients in the buchimgae were eggs, shrimps and chopped Chinese chives. The girl had previously consumed these individual ingredients without allergic incident. Other family members, who were non-atopic, had consumed the same pancakes on that occasion without any adverse effects. The girl had a history of atopic asthma and dermatitis since she was 3 years old, without a history of aspirin intolerance. She had no history of exercise or drug use as a trigger of symptoms. On arrival at the emergency department, she was afebrile with a respiratory rate of 24 breaths per minute and her blood pressure and pulse rate were normal. Auscultation of the chest revealed expiratory wheezes in both lungs, as she also had a

Abbreviations: OMA, oral mite anaphylaxis; NSAID, nonsteroidal anti-inflammatory drug; COX-1, cyclooxygenase-1.

* Corresponding author. Department of respiratory medicine, Tokyo Medical University, 6-7-1 Nishishinjuku, Shinjyuku-ku, Tokyo, 160-0023, Japan.

E-mail addresses: sen-s@horae.dti.ne.jp (S. Senba), taktsuji@tokyo-med.ac.jp (T. Tsuji), reo1129@tokyo-med.ac.jp (R. Kikuchi), iwaiyuki@tokyo-med.ac.jp (Y. Iwai), jkawagoe147@tokyo-med.ac.jp (J. Kawagoe), hiroyuki@tokyo-med.ac.jp (H. Nakamura), kaoshiba@tokyo-med.ac.jp (K. Aoshiba).

<https://doi.org/10.1016/j.rmcr.2020.101026>

Received 14 November 2019; Received in revised form 8 February 2020; Accepted 20 February 2020

Available online 4 March 2020

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history of bronchial asthma. The results of laboratory findings are as follows: The leukocyte count was 6500/ μ L; 4% were eosinophils. The results of routine serum chemical studies were normal. The serum specific IgE analysis was positive for antibodies to dust mite allergens (*Dermatophagoides pteronyssinus*, *Dermatophagoides farina*, *Tyrophagus putrescentiae*, *Lepidoglyphus destructor*, *Acarus siro*), but negative for antibodies to wheat, egg yolk, egg white, shrimp, beef and potato (Table 1). A urinalysis was normal, with no active sediments. A chest radiograph revealed no abnormal shadows in the bilateral lung fields. After treatment with intravenous fluids, inhaled procaterol and hydrocortisone 300mg intravenously, the patient recovered fully and was discharged two days later. Microscopic examination of the mixed wheat flour, which had been stored in a plastic container at ambient temperature for several weeks after opening, revealed the presence of large numbers of live dust mites (Fig. 1). The anaphylactic episode in this patient was concluded to be the result of ingestion of wheat flour contaminated with mites.

3. Discussion

OMA is a syndrome characterized by severe allergic manifestations occurring shortly after the intake of foods made with mite-contaminated wheat flour [1]. Although cases of OMA have mostly been reported from tropical countries, new cases from temperate regions of the world are being increasingly reported especially in Spain, Venezuela and Japan [1]. High temperature and relative humidity are favorable climatic conditions for mite proliferation in food. The current long-term rise in the average temperature known as global warming will change the prevalent regions of OMA. Moreover, long periods following the purchase of wheat flour can induce OMA in places other than prevalent regions [2]. OMA should be considered also in non-prevalent regions, especially for cases with risk factors for the development of OMA.

A history of atopic disease and NSAID hypersensitivity and have been identified as risk factors for the development of OMA [1]. Meanwhile, the association of NSAID hypersensitivity with OMA was reported to be relatively rare in Japan [3]. Also in this case, she had a history of atopic asthma, without a history of aspirin intolerance. Other family members, who had consumed the same pancakes without any adverse effects, were non-atopic. In this Japanese case, the presence of atopic disease may have triggered the onset of OMA as a risk factor. OMA should be suspected in Japanese patients, especially with a history of atopic disease, concerning acute symptoms during or immediately after eating foods prepared with wheat flour. Hidden allergens including OMA are difficult to detect and elaborate for diagnosis as food triggers. Co-factors such as exercise, alcohol, or NSAID are also resources likely to elicit a hidden allergen [4], however, there were no significant co-factors in this case. Allergy history is also important in determining food triggers, and the presence of atopic disease in this case elicited the likelihood of a hidden allergen as a trigger onset of OMA. A high prevalence (50%) of hypersensitivity to aspirin and NSAID has been also observed in patients with OMA [1,5]. To explain this association, the inhibition of cyclooxygenase-1 (COX-1) by mite constituents and genetic abnormality predisposing patients to cross-reactive hypersensitivity to mites and COX-1 inhibitors have been postulated [1]. Although the association of NSAID hypersensitivity with OMA was relatively rare in Japan and no history of aspirin intolerance in this case, OMA should be generally suspected in patients with a history of atopic disease or NSAID. Further studies are needed to identify the characteristics of patients with OMA in various countries and regions.

Other investigators have reported that the symptoms could not be reproduced after testing with lyophilized mites in patients with OMA, suggesting that the combination of heat, flour, and mites may lead to the development of certain undetermined products with the potential to induce severe reactions in specific subjects [6]. They also reported that 3 of 176 opened packages from retail outlets and 7 of 127 from homes were infested with mites, however, no mites were found in the packages

Table 1
Blood test results.

	Presentation	Reference values
Total IgE, IU/mL	700	to 170
Allergen-specific IgE (Fluorescence-enzyme immunoassay)		
Mites		
<i>Dermatophagoides Pteronyssinus</i>	Class 6	
<i>Dermatophagoides farina</i>	Class 6	
<i>Tyrophagus putrescentiae</i>	Class 3	
<i>Lepidoglyphus destructor</i>	Class 3	
<i>Acarus siro</i>	Class 3	
Foods		
Wheat	Class 0	
Buckwheat	Class 0	
Milk	Class 0	
Egg yolk	Class 0	
Egg white	Class 0	
Salmon	Class 0	
Shrimp	Class 0	
Crab	Class 0	
Beef	Class 0	
Potato	Class 0	

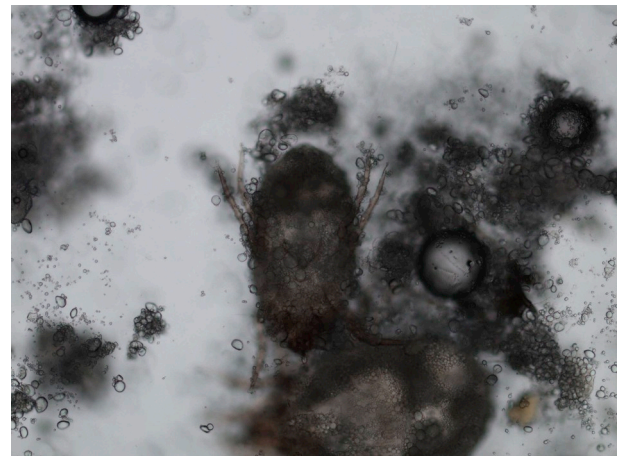


Fig. 1. Light microscopy photograph of a dust mite in a flour sample. Original magnification: 100x.

stored in a refrigerator [6]. To prevent mite proliferation and the development of OMA, it is recommended that wheat flour should be stored in sealed bags or containers at low temperatures in a refrigerator after opening.

4. Conclusions

OMA was induced by the ingestion of wheat flour contaminated with mites. Physicians should be aware of this clinical picture especially in patients with NSAID hypersensitivity or a history of atopic disease, and be ready to recognize, treat, and prevent this life-threatening condition. To prevent mite proliferation and the development of OMA, it is recommended that wheat flour should be stored in the refrigerator after opening.

Declaration of competing interest

The authors declare that there is no competing interests regarding the publication of this case report.

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