

Pancake syndrome after vegan supplementation

Síndrome del pancake tras suplementación vegana

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Abstract

Pancake syndrome or anaphylaxis after mite ingestion, known as “OMA” (Oral Mite Anaphylaxis), is a rare condition characterized by an immunoglobulin E-mediated reaction, usually severe, after consumption of mite-contaminated flours. Its prevalence is unknown, but it has been associated with different families of mites and foods such as flours, cereals, seeds, tea leaves, and sausages. Symptoms, of rapid or immediate onset, can range from urticaria, bronchospasm to anaphylaxis. Cases of exercise-induced OMA have also been reported. The first reported case of anaphylaxis due to mite ingestion was in 1993 due to consumption of a flour preparation for making beignets (fried dough). The commercial mixture under the microscope revealed the presence of *Dermatophagoides farinae*.

Keywords: Pancake. Syndrome. Oral mite anaphylaxis. *Dermatophagoides*. Mites.

Resumen

El ‘Síndrome del Pancake’ o la anafilaxia tras ingestión de ácaros, conocido por sus siglas en inglés como ‘OMA’ (Oral Mite Anaphylaxis), es un cuadro poco frecuente que se caracteriza por una reacción mediada por IgE, generalmente grave, tras el consumo de harinas contaminadas por ácaros. Su prevalencia es desconocida, pero se ha relacionado con distintas familias de ácaros y alimentos como harinas, cereales, semillas, hojas de té y embutidos. Los síntomas, de instauración rápida o inmediata, pueden incluir desde urticaria, broncoespasmo hasta anafilaxia. Asimismo, se han descrito también casos de OMA inducida por ejercicio físico. El primer caso reportado de anafilaxia por ingestión de ácaros fue en 1993 por consumo de un preparado de harinas para elaborar beignets (buñuelo o masa frita). La mezcla comercial en el microscopio reveló la presencia de *Dermatophagoides farinae*.

Palabras clave: Pancake. Síndrome. OMA. *Dermatophagoides*. Ácaros.

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Introduction

Allergic sensitization to house dust mites (in particular *Dermatophagoides pteronyssinus* and *Dermatophagoides farinae*) is common and usually presents with symptoms of rhinitis or conjunctivitis. However, in situations where large amounts of mite allergen are ingested, more severe symptoms, such as anaphylaxis or asthmatic crisis, may be induced. These cases of anaphylaxis due to oral ingestion of mite-contaminated flour have been described as pancake syndrome or anaphylaxis after mite ingestion. Pancake syndrome is rare and is considered a potentially occult cause, as it is likely to be overlooked by physicians who are probably unfamiliar with the condition.

Clinical observation

We present the case of a 30-year-old male diagnosed with rhinitis and mild intermittent bronchial asthma, well controlled, due to sensitization to *D. pteronyssinus* and *D. farinae*. The patient developed an abrupt onset characterized by dry cough and dyspnea approximately 30 min after ingesting a protein flour of vegan origin. On arrival in the emergency department, scattered wheezing and oxygen saturation of 90% were evident. Chest X-ray was normal. The condition remitted with short-acting bronchodilators and systemic corticosteroids.

Given the causal and temporal relationship between the consumption of the supplement and the onset of symptoms, an allergological study was carried out which included the following battery of tests. Skin tests were performed in prick-test with commercial battery of expanded mites (house and storage dust) and prick-prick with the extract of the implicated flour, hemp, and pea seeds (ingredients of the protein preparation) which were negative. The results were positive for *D. pteronyssinus*, *Der p 1*, *Der p 2*, and *D. farinae* (Fig. 1).

A determination of total and specific immunoglobulin E (IgE) was also performed using the ImmunoCAP method, obtaining the following results: total IgE 59 kU/l, *D. pteronyssinus*: 1.39 kU/l, *D. farinae*: 0.43 kU/l and negative for *Lepidoglyphus destructor*, *Acarus siro*, *Blomia tropicalis*, *Triticum aestivum* (wheat), gluten, *Secale cereale* (rye), *Hordeum vulgare* (barley), *Avena sativa* (oats), *Oryza sativa* (rice), and *Pisum sativum* (pea).

In view of the negative results of the skin tests with the flour and the suspicion of possible contamination

of the flour by mites, the sample was analyzed under optical microscopy. Microorganisms compatible with mites were isolated and after morphological study, *D. pteronyssinus* was identified (Fig. 2).

Finally, the diagnosis of "Pancake Syndrome" or oral mite anaphylaxis/asthma (OMA) was established. It was recommended to substitute the supplement for a protein of a batch or brand, which has been well tolerated by the patient, without incidents.

Discussion

OMA is a rare condition characterized by an IgE-mediated reaction, usually severe, after consumption of mite-contaminated flours¹. Its prevalence is unknown, but it has been associated with different families of mites and foods such as flours, cereals, seeds, tea leaves, and sausages². Symptoms, of rapid or immediate onset, can range from urticaria, bronchospasm to anaphylaxis. Cases of exercise-induced OMA have also been reported. The first reported case of anaphylaxis due to mite ingestion was in 1993 due to consumption of a flour preparation for making beignets (fried dough). The commercial mixture under the microscope revealed the presence of *D. farinae*³.

Among the most commonly reported causative agents are mites of the family *Pyroglyphidae*, *Glycyphagidae*, *Echimyopodidae*, *Acaridae*, and *Suidasiidae*. Within the family *Pyroglyphidae* is *D. pteronyssinus* and *farinae*⁴. *D. pteronyssinus* is a species of house dust mite belonging to the order Sarcoptiformes. It is widely distributed in domestic environments, especially in regions with temperate climates and high relative humidity. These microscopic mites, with an average length of 250–300 µm, feed mainly on human dermal detritus, such as skin scales, and thrive in mattresses, carpets, bedding, and upholstery.

The body of *D. pteronyssinus* is oval-shaped, semi-transparent, and varies in length from 250 to 320 µm in adults. It is divided into two main regions: the gnathosoma, which includes the oral structures (chelicerae and pedipalps), and the idiosoma, which houses the rest of the body, including the legs and internal organs⁵. It has four pairs of segmented legs, adapted to move on fibrous surfaces. Not only that but also it has no eyes, but has specialized sensory quetas distributed on the body, which fulfill mechanoreceptor and chemoreceptor functions. The cuticle shows a distinctive

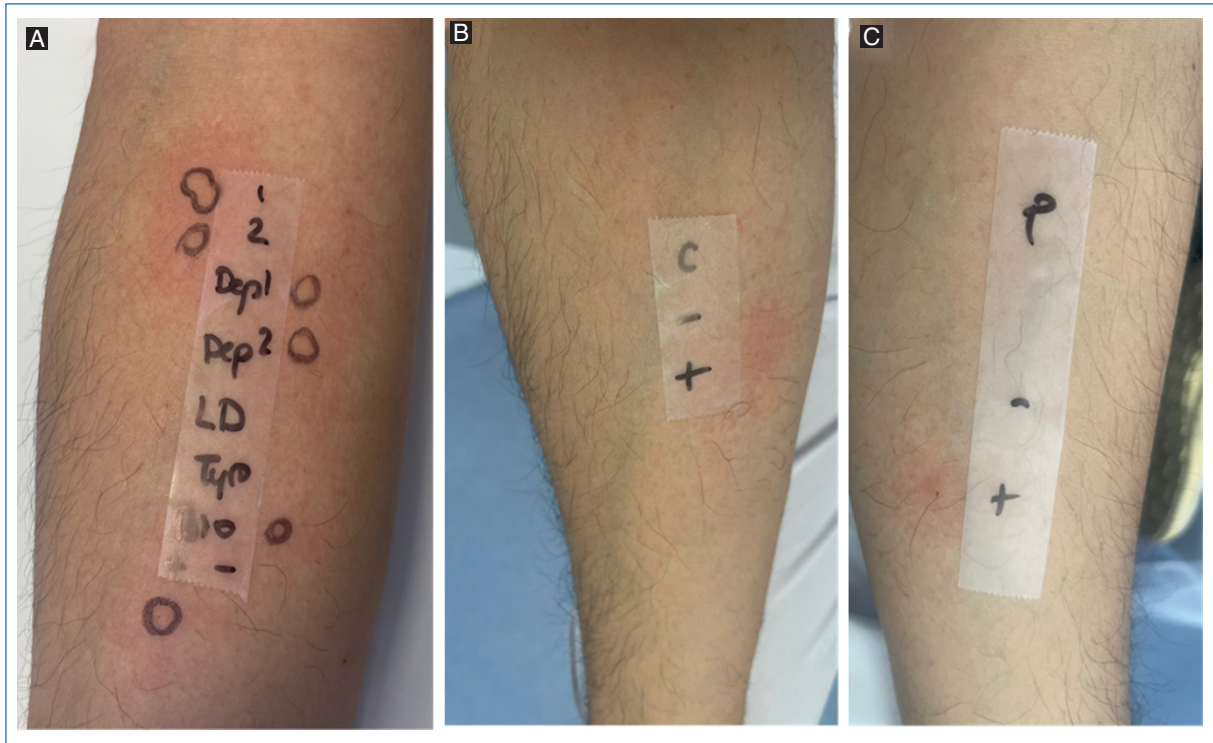


Figure 1. **A:** skin prick-test with commercial mite extract. **B:** prick-prick with hemp seed. **C:** prick-prick with vegan protein. **A:** prick test: positive for (1) *Dermatophagoides pteronyssinus* and (2) *Dermatophagoides farinae*, *Der p 1*, *Der p 2*, histamine. Weakly positive for *Blomia tropicalis*. Negative for *Lepidoglyphus destructor* and SSF. **B:** prick-prick: Positive: histamine. Negative: hemp seed, SSF. **C:** prick-prick: negative for vegan protein and SSF. Positive for histamine.

longitudinal striation and glands involved in the production of pheromones and other secretions.

This species is a major source of aeroallergens worldwide. More than 20 specific allergens have been identified in *D. pteronyssinus*, most notably: *Der p 1*, a cysteine protease that fragments epithelial junctions, facilitating the penetration of other allergens; *Der p 2*, a structural protein homologous to lipid-binding proteins of the MD-2 family, capable of activating Toll-like receptor-4 receptors; and *Der p 23*, a recently characterized allergen present in the body shell and feces of the mite⁶.

We report one of the few cases described that presents exclusively with respiratory symptoms and the first, to our knowledge, related to the consumption of vegan protein. The diagnosis is based on the appearance of compatible symptoms after ingestion of food prepared with flour contaminated with mites, in previously sensitized patients. Usually with a history of allergic respiratory disease, atopic dermatitis and/or intolerance to non-steroidal anti-inflammatory drugs, and is confirmed by the identification of mites in the product involved⁷.



Figure 2. *Dermatophagoides pteronyssinus* seen under light microscope. This species belongs to the family *Pyroglyphidae* oval segmented body, eight jointed legs, sensory setae, or hairs protruding from the body and legs. Optical microscopic view with a 4/0-160/0.17 magnification lens.

Funding

None.

Conflicts of interest

None.

Ethical considerations

Protection of humans and animals. The authors declare that the procedures followed complied with the ethical standards of the responsible human experimentation committee and adhered to the World Medical Association and the Declaration of Helsinki. The procedures were approved by the Institutional Ethics Committee.

Confidentiality, informed consent, and ethical approval. The authors have followed their institution's confidentiality protocols, obtained informed consent from patients, and received approval from the Ethics Committee. The SAGER guidelines were followed according to the nature of the study.

Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

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