

Bread eating induced oral angioedema due to α -amylase allergy

Á. Moreno-Ancillo(1), C. Domínguez-Noche(1), A. C. Gil-Adrados(2),
P. M. Cosmes (1)

(1) Allergy Unit. Hospital Virgen del Puerto, Plasencia, Cáceres, Spain.

(2) Centro de Salud "La Estación", Talavera de la Reina, Toledo, Spain.

Abstract. Inhalation of dust from different enzymes can be the cause of occupational asthma in exposed workers. Enzymes from different sources are being increasingly used in food. Few cases of food allergy to α -amylase induced by eating bread have been reported. Those cases were reported in bakery-related patients and in a pharmaceutical-industry worker. A 25-year-old farmer suffered sneezing, rhinorrhea, oropharyngeal itching, hoarseness, cough, and non-wheezy dyspnea after eating white bread. Skin prick tests (SPT) with common aeroallergens and food allergens revealed only sensitization to *Olea europaea* pollen. SPT response was positive to *Aspergillus oryzae* α -amylase. Specific IgE against α -amylase was positive. A double-blind placebo-controlled challenge with 5 mg of uncooked α -amylase induced sneezing, cough, oral angioedema within 10 minutes. The provocation test with 50 g of white bread gave similar findings. This case indicates that α -amylase contained in bread may provoke IgE-mediated food allergy. It is worth noting that in this case, the only source of α -amylase sensitization was bread.

Key words: α -amylase, food allergy, bread, asthma, angioedema,

Introduction

Inhalation of dust from different enzymes can be the cause of occupational asthma in exposed workers. Enzymes from different sources are being increasingly used in food. The enzyme α -amylase from *Aspergillus oryzae* used in bakeries to improve the bread quality has been identified as an inhaled allergen in baker's asthma [1]. To compensate for a low content of natural amylase, α -amylase is added to wheat flour to enhance carbohydrate fermentation by yeast. Also in the pharmaceutical-industry there are workers exposed to powdered α -amylase. The frequency of sensitization in exposed workers ranges from 24% to 34% [2, 3]. It is doubtful whether this amylase in the final product, i.e. after the baking procedure, can still be regarded as an allergen. Moreover, few cases of food allergy to α -amylase induced by eating bread have been reported so far [4, 5]. Those cases were reported in bakery-related patients and in a pharmaceutical-industry worker [3-5].

Case report

A 25-year-old farmer with mild seasonal allergic rhinitis who was a non-smoker, was first seen with sneezing, rhinorrhea, oropharyngeal itching, hoarseness, cough, and non-wheezy dyspnea after eating white bread. He did not refer any symptom with industrial tin loaf (industrial bread baked in a rectangular tin). He never worked in a bakery. He never worked in a pharmaceutical industry.

Allergy tests

Skin prick tests (SPT) with common aeroallergens and food allergens revealed only sensitization to *Olea europaea* pollen. SPT responses to cereal pollens and cereal flours were negative. SPT response was, however, positive to *Aspergillus oryzae* α -amylase (1 mg/ml; Leti Laboratory, Spain), with a wheal diameter of 5 mm. SPT responses to α -amylase from *Bacillus subtilis* and other enzymes were all negative.

Specific IgE against α -amylase was detected in the patient's serum at a level of 47 KUI/L (Cap system; Pharmacia, Uppsala, Sweden). Specific IgE antibodies against all kind of flours were not detected. A double-blind placebo-controlled food challenge with 5 mg of uncooked α -amylase induced sneezing, cough, oral angioedema within 10 minutes. The provocation test with 50 g of white bread was also positive with similar findings.

We suggested that the patient avoid all bakery products containing α -amylase.

Discussion

This case indicates that α -amylase contained in bread may provoke IgE-mediated food allergy. It is worth noting that in this case the only source of α -amylase was bread. Our patient was not related to any bakery job. He never worked in a pharmaceutical-industry job. He worked in agriculture. In other reported cases the source of sensitization was direct or indirectly associated to bakery-related or pharmaceutical-industry jobs [3-5]. A pharmaceutical-industry worker exposed to powdered α -amylase, with allergic asthma due to α -amylase, had a positive response to oral provocation with this enzyme, presenting abdominal, skin, and respiratory symptoms a few minutes after ingestion [3]. The patients in these cases were initially sensitised to α -amylase or flours by inhalation during their previous jobs [3-5]. The allergic reaction of our patient could be induced by both cooked and uncooked α -amylase, which shows that cooking did not destroy the allergenic activity of this enzyme [6]. The use of α -amylase as an additive has been authorized in Europe in the 1980's. Some kinds of bread contain very low levels of the enzyme, that is the reason why our patients tolerated them. White bread contains

approximately 4 to 18 mg of α -amylase per 100 gm portion. Our case points out to the risk of masked food allergy to α -amylase, which is used not only in baked goods and sweets but can also be present in other foods [7].

References

1. Blanco Carmona JG, Juste Picon S, Garcés Sotillos M. Occupational asthma in bakeries caused by sensitivity to α -amylase. *Allergy* 1991; 46:274-6.
2. Baur X, Fruhmant G, Haug B, Rasche B, Reiher W, Weiss W. Role of aspergillus amylase in baker's asthma. *Lancet* 1986; 1:43
3. Losada E, Hinojosa M, Quirce S, Sanchez-Cano M, Moneo I. Occupational asthma caused by α -amylase inhalation: clinical and immunologic findings and bronchial response patterns. *J Allergy Clin Immunol* 1992; 89:118-25.
4. Kanny G; Moneret-Vautrin DA. α -Amylase contained in bread can induce food allergy. *J Allergy Clin Immunol* 1995, 95: 132-3.
5. Baur X, Czuppon AB. Allergic reaction after eating alpha amylasa (Asp o2)-containing bread. A case report. *Allergy* 1995, 50: 85-7
6. Sander I, Raulf-Heimsoth M, Van Kampen V, Baur X. Is fungal α -amylase in bread an allergen?. *Clin Exp Allergy* 2000;30: 560-65.
7. Sampson HA, Mendelson L, Rosen J. Fatal and near-fatal anaphylactic reactions to food in children and adolescents. *N Engl J Med* 1992; 327:380-4.

Dr. Álvaro Moreno Ancillo

Unidad de Alergia; Hospital Virgen del Puerto
Paraje de Valcorchero s/n
Plasencia 10600; Cáceres, Spain
E-mail: alanaro@telefonica.net