Baker's asthma in a child

M.C. Moreno-Escobosa, E. Alonso, A. Ausín, A. Elices, M.D. Ibáñez, and **M.T. Laso**

Allergy Department. Hospital del Niño Jesús, Madrid, Spain.

SUMMARY

Background: baker's asthma is a well-known occupational lung disease which usually develops in adults. We report the case of a two years old boy who suffered from asthma, urticaria and atopic dermatitis for twelve months, whose symptoms were associated to visits to his grandfather's bakery.

Methods and results: skin prick tests (SPT) were made to dust mites, moulds, flours, alfa-amylase and egg. It was also determinated total IgE and specific IgE antibodies to alfa-amylase and flours. Subsequently, a challenge test was carried out with wheat flour. The SPTs were positive to flours, alfa-amylase and egg. The determination of specific IgE antibodies showed 2.64 kU/L to wheat, 0.79 kU/L to glyadin and 2.98 kU/L to alfa-amylase. The patient developed asthma and rhinitis after manipulating wheat flour for 10 min.

Conclusions: we demonstrated a type I hypersensitivity to wheat flour and alfa-amylase in a two years old child by SPT, specific IgE antibodies and challenge test. This case in the childhood equivalent of occupational baker's asthma.

Key words: Baker's asthma. Alpha-amylase. Occupational asthma. Flour hypersensitivity. Child. Early exposition.

Allergol et Immunopathol 2001; 29(4): 141-143.

INTRODUCTION

Baker's asthma is a well-known occupational asthma. Baker's work in a atmosphere filled with wheat flour additives, being at risk developing respiratory symptoms (1, 2).

CASE REPORT

A 2 years old boy started suffering mild asthma, urticaria and atopic dermatitis from one years old. His parents linked asthma and urticaria symptoms to visits to the boy's grandfather bakery where his mother worked. Soon she realized he suffered from urticaria and sneezing after contacting with flour powder from her clothes. Besides, he suffered from urticaria whenever he ate egg. Cooked flour, bread and pastry were perfectly tolerated. When he was two years old, he started going to the nursery school, so exposition to the allergen diminished and the child's disease improved. He only suffered symptoms related to isolated school activity with flour's play or flour exposures in the grandfather' bakery. A later oral challenge with egg was carried out at 4 years old with negative result.

MATERIAL AND METHODS

SPTs were performed with dust mites, moulds (Lab. ALK-Abelló, Spain), flour, alfa amylase and egg (Lab. CBF-Leti, Spain). It was determinated specific IgE antibodies (using CAP System Pharmacia, Uppsala, Sweeden) to wheat, glyadin, alfa-amylase, dust mites and moulds. Besides, it was calculated total IgE and carried out challenge test (manipulating and playing with the flour).

RESULTS

The wheat, soja and rye flour, alfa-amylase and egg prick tests were positive. Wheals diameters of 4, 3, 5.2 and 6 mm were obtained for wheat flour, soja flour, alfa-amylase glyadin, and egg respectively. SPT with dust mite and moulds were negative.

Total IgE was 244 kU/L. The specific IgE values were 2.64 kU/L to wheat, 0.79 kU/L to glyadin and 2.98 kU/L to alfa-amylase. An open controlled challenge was performed with positive result. After 10 min of manipulating wheat flour, the patient showed cough, wheezing, rhinitis with hydrorrea and sneezing. The symptoms was resolved spontaneously after washing face and hands.

An oral challenge also was carried out with egg, and in 15 min the patient developed urticaria and facial angioedema. One year later, oral challenge was again repeated with egg without any adverse reaction.

DISCUSSION

Baker's asthma is one of the most frequent occupational diseases and it is only developed by workers. Cereal flour and alpha amylasa used as additive are the responsible allergens. The frequency of sensitisation in exposed workers range from 24 to 34 %. As far as we know, none cases of baker's asthma in children have never been described in literature and the only know non-occupational case corresponds to a baker's wife who had asthma after eating bread (3). Even though our patient's asthma has not a direct occupational source, he has stayed every day at working hours in a room next to the bakery where his mother worked and was exposed to a high degree of flour and enzymes in a early step of life. According to clinical history and tests results, we recommended the boy to avoid contact with raw flour. Nowadays, his parents live far away from the bakery, and visits to the bakery were suspended, except during the weekends.

Since then, the reported symptoms improve. He only suffered one episode of urticaria and sneezes during a school activity in which his school mates had to handle wheat flour and some times mild urticaria in grandfather's house situate above the bakery.

Several months ago and after staying in the grandfather's bakery the child developed asthma crisis and had to stay in hospital for several days. This fact shows that weat flour sensitisation persists and symptoms reappear when contacting the allergen.

In several publications it has been reported the relationship between the early induction of sensitisation to indoor allergens during infancy and early childhood and the domestic allergen exposure, regardless of the family history of atopy. So, the demonstration of a dose response relationship between exposure to cat and mite allergens and specific sensitisation was possible (4). We think that, in our patient, atopy personal history seems to play an important role in the development of IgE-sensitisation to alfa-amylase, joint with an early and remarkable exposition to this allergen (5). This case follows the behaviour known as "atopic march" (6) that often commences in the first months of life with atopic dermatitis and associated food allergy, leading to other allergic diseases as rhinitis and asthma.

In summary, we have demonstrated by SPTs, specifics seric IgE antibodies and challenge test and immediate hypersensitivity (type I) to wheat flour and alfa-amylase in a two years old child with an early exposition to these allergens. We believe that this case is the childhood equivalent of occupational baker's asthma.

RESUMEN

Caso clínico: paciente varón que consultó a los 2 años de edad por cuadros de asma y dificultad respiratoria que los padres relacionaban con visitas a la panadería propiedad de los abuelos y en la que la madre trabaja habitualmente. El niño presenta desde los 4 meses de vida dermatitis atópica y urticaria tras ingestión de huevo desde su introducción en la dieta. El paciente tolera sin problemas harinas cocinadas en forma de pan, bollería y pastas. Los 15 primeros meses de vida el niño permaneció diariamente el cuidado de su madre en una habitación próxima al horno de pan.

Material y métodos: se realizaron pruebas subcutáneas en *prick test* y se midió IgE total y específica por método CAP para harinas de trigo y otros cereales, alfa-amilasa, ácaros, hongos ambientales y alimentos. Se procedió a realizar provocación controlada en la consulta mediante exposición a harinas que el paciente manipuló durante unos minutos. Los *prick tests* resultaron positivos para harinas, alfa-amilasa y huevo y negativos para el resto de los inhalantes y alimentos. La IgE total fue de 244 kU/L, el CAP para trigo de 2,64 kU/L, para gliadina de 0,79 kU/L y para alfa-amilasa de 2,98 kU/L. Tras manipular una pequeña cantidad de harina el paciente presentó a los 10 min tos, leve disnea con sibilancias, rinitis con estornudos y rinorrea que cedieron espontáneamente tras retirar al paciente y tras el lavado de manos y cara.

Se recomendó al paciente la evitación de contacto con harinas y se aconsejó no acudir a la panadería. El cuadro clínico ha mejorado con la excepción de urticaria y disnea por manipulación de harina en el curso de actividades escolares y alguna crisis ocasional tras visitar la casa de los abuelos situada sobre la panadería.

Conclusiones: se ha demostrado por historia clínica, pruebas *in vivo e in vitro* y provocación por manipulación la existencia de una sensibilización medida por IgE a la harina y alfa-amilasa. Este cuadro consti-

tuye en la infancia el equivalente al asma ocupacional del panadero.

Palabras clave: Asma del panadero. Alfa-amilasa. Asma ocupacional. Hipersensibilidad a la harina. Niños. Exposición temprana.

Correspondence:

E. Alonso Lebrero
Ambros, 17, col. Iturbe
28028 Madrid, Spain
Tel.: + 34 917 251 516
E-mails: alonsol@nacom.es
moreno.escobosa@teleline.es

REFERENCES

1. Sandiford CP, Tee RD, Newman Taylor AJ. The role of cereal and fungal amylases in cereal flour hypersensitivity. Clin Exp Allergy 1994; 24: 549-57.
2. Quirce S, Cuevas M, Díez-Gómez ML, Fernández-Rivas M, Hinojosa M, González R, Losada E. Respiratory allergy to Aspergillus-derived enzymes in baker's asthma. J Allergy Clin Immunol 1992; 90: 970-8.
3. Kanny G, Moneret-Voutrin DA. α-amylase contained in bread can induce food allergy. J Allergy Clin Immunol 1995; 95: 132-3.
4. Whan U, Bergman R, Kulig M, Foster J, Bauer CP. The natural course of sensitisation and atopic disease in infancy and childhood. Pediatr Allergy Immunol 1997; 8 (Suppl 10): 16-20.
5. Houba R, Van Run P, Doekes G, Heederick D, Spithoven J. Airborne of α-amylase allergens in bakeries. J Allergy Clin Immunol 1997; 99: 286-92.
6. Warner JO. Early treatment of thee atopic child. Pediatr Allergy Immunol 1997; 8 (Suppl 10): 46-8.