

*Piazza Volsinio 7
00199 Roma
Italy
E-mail: claudia.alessandri@fastwebnet.it

Accepted for publication 27 October 2003
Allergy 2005; 60:128–129
Copyright © Blackwell Munksgaard 2004
DOI: 10.1111/j.1398-9995.2004.00449.x

References

1. Langeland TA. Clinical and immunological study of allergy to hen's egg white VI. Occurrence of protein cross-reacting with allergens in hen's white as studied in egg white from turkey, duck, goose, seagull and in hen egg yolk, and hen and chicken sera and flesh. *Allergy* 1983;**38**:399–412.
2. Takahashi K, Horiguchi M, Bando N, Tsuji H, Ogawa T, Asao T. Immunochemical characterization of ovomucoid from Japanese quail egg white using monoclonal antibodies. *J Nutr Sci Vitaminol (Tokyo)* 1999;**45**:491–500.
3. Tan BM, Sher MR, Good RA, Bahna SL. Severe food allergies by skin contact. *Ann Allergy Asthma Immunol* 2001;**86**:583–586.
4. Quirce S, Diez-Gomez L, Eiras P, Cuevas M, Baz G, Losada E. Inhalant allergy to egg yolk and egg white proteins. *Clin Exp Allergol* 1998;**28**:478–485.

Sheep and goat's milk allergy – a case study

P. Martins*, L. M. Borrego, G. Pires, P. L. Pinto, A. R. Afonso, J. Rosado-Pinto

Key words: cow's milk allergy and immunoblotting; goat's milk allergy; sheep's milk allergy.

Cow's milk allergy (CMA) is an important problem in infancy and early childhood. Cross-reactivity between proteins from cow, sheep and goat's milk explains why eviction diets in CMA patients should not include these proteins (1).

Allergy to sheep and goat's milk without CMA is rare. In Mediterranean

countries, sporadic cases have been reported, which seem to be related to traditional diets (2, 3). We report two cases of an IgE-mediated allergy (4) to goat and sheep's milk without any actual clinical CMA.

Case 1. A 9-year-old boy experienced, at the ages of 6 and 7, two episodes of lip swelling and dyspnoea 5 min after eating pizza made from different cheeses. He had had no symptoms related to cow's milk intake. Skin prick tests (SPT) were carried out using cow, sheep and goat's milk commercial extracts (ALK-Abelló, Hørsholm, Denmark), with a positive reaction to sheep's milk (8 × 20 mm) and goat's milk (6 × 15 mm). SPT and specific IgE (UniCAP[®]; Pharmacia Diagnostics, Uppsala, Sweden) for cow's milk were negative. No challenge test was performed on this patient, as the informed consent was not obtained. Goat's milk immunoblotting analysis (AlaBLOT[®]; DPC, Los Angeles, CA, USA) was positive, showing several IgE-binding bands (12, 14, 25, 32, 35 and 80 kDa).

Case 2. A 4-year-old boy with past CMA and no symptoms with cow's milk and dairy products from the age of 17 months, experienced, during the last 2 years, recurrent episodes of facial urticaria and lip swelling some minutes after contact with goat and sheep's cheese. SPT (ALK-Abelló) were positive to sheep's milk (15 × 5 mm) and goat's milk (17 × 5 mm). SPT were also positive to total cow's milk (8 × 7 mm), β-lactoglobulin (6 × 5 mm) and casein (4 × 3 mm), and negative to α-lactalbumin. Specific IgE (UniCAP[®]) was 4.5 kU/l (class 3) for total cow's milk, 4.0 kU/l (class 3) for casein and negative for α-lactalbumin and β-lactoglobulin. An oral challenge test with goat's milk was positive with facial and neck urticaria, swelling of the eyelids and bronchospasm. This patient was positive to cow and goat's immunoblotting (AlaBLOT[®]). Immunoblotting inhibition assay (AlaBLOT[®] inhibition assay procedure) was performed to confirm that this patient was sensitized to both cow and goat's milk allergens due to the recognition of different proteins (Fig. 1).

When performing the goat's milk inhibition assay, a total inhibition was found for both goat (positive control) and sheep's milk extracts but only 13.5%

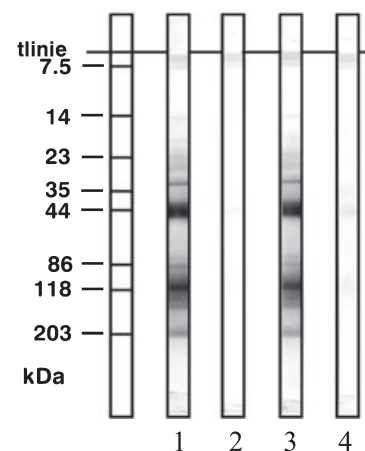


Figure 1. Goat's milk AlaBLOT[®] IgE assay: IgE binding to goat's milk allergen was completely inhibited by goat's and sheep's milk extracts (99.4 and 98.7%, respectively) and not inhibited by cow's milk extract (13.5%). Lane 1: noninhibited; lane 2: inhibited with goat's milk extract; lane 3: inhibited with cow's milk extract; lane 4: inhibited with sheep's milk extract.

for cow's milk extract (no inhibition) (Table 1). Concerning the cow's milk inhibition assay, a total inhibition was found for cow's milk extract (positive control) and a partial inhibition for goat's milk (80.2%). These results support that patient symptoms did not result from cross-reaction between goat and cow's milk allergens.

The first case brings up the possibility of the existence of an allergy to sheep and goat's milk without any previous or current history of CMA. The second case shows that a patient who outgrows his CMA can have clinical manifestations to a different kind of milk. Skin and blood tests suggest a new sensitization to sheep and goat's milk.

Table 1. Sheep and goat's milk allergy without cow's milk allergy: IgE binding to goat's milk allergens was completely inhibited by goat and sheep's milk extracts and not inhibited by cow's milk extract

| | Inhibition with CM | Inhibition with GM | Inhibition with SM |
|----|--------------------|--------------------|--------------------|
| GM | 13.5 | 99.4 | 98.7 |

GM, goat's milk; SM, sheep's milk; CM, cow's milk. Values represent percentage of immunoblotting inhibition with different milk extracts.

*Serviço de Imunoalergologia do Hospital de Dona Estefânia
 Rua Jacinta Marto
 1169-045 Lisboa
 Portugal
 Fax: + 351-213126654
 E-mail: hde.imunoalergo@mail.telepac.pt

Accepted for publication 17 December 2003
 Allergy 2005; 60:129–130
 Copyright © Blackwell Munksgaard 2004
 DOI: 10.1111/j.1398-9995.2004.00498.x

References

1. Spuergerin P, Walter M, Schiltz E, Deichmann K, Forster J, Mueller H. Allergenicity of alpha-caseins from cow, sheep, and goat. *Allergy* 1997;**52**:293–298.
2. Umpierrez A, Quirce S, Maranon F. Allergy to goat and sheep cheese with good tolerance to cow cheese. *Clin Exp Allergy* 1999;**29**:1064–1068.
3. Alvarez MJ, Lombardero M. IgE-mediated anaphylaxis to sheep and goat's milk. *Allergy* 2002;**57**:1091–1092.
4. Johansson SG, Hourihane JO, Bousquet J, Brujnzeel-Koomen C, Dreborg S, Haahtela T et al. A revised nomenclature for allergy. An EAACI position statement from the EAACI nomenclature task force. *Allergy* 2001;**56**:813–824.

Allergic reactions to macadamia nut

M. Lerch, C. Egger, A. J. Bircher*

Key words: anaphylaxis; cross-reactivity; macadamia; specific IgE; tree nut allergy.

Anaphylactic reactions are frequently caused by either peanuts or tree nuts (1). Macadamia nut is considered to be one of the prime edible nuts. It grows on two species of Australian trees, *Macadamia integrifolia* and *M. tetraphylla*. Although not as commonly consumed as other tree nuts or peanuts, macadamia can occasionally cause serious allergic reactions (2–5). We report on two

Anaphylaxis and oral allergy syndrome to macadamia nut.

patients with allergic reactions to this nut.

A 42-year-old man developed generalized pruritus, itching of the throat, rhinitis, dyspnea and dizziness 5 min after eating a few roasted macadamia nuts. The patient had a history of seasonal allergic rhinitis and asthma and oral itching when eating carrots, apples or walnuts.

Skin-prick tests (SPT) were performed with standardized extracts (ALK Abello, Høsholm, Denmark). Positive tests were observed to tree pollen (birch, alder, hazel, ash, beech, oak) as well as rye grass and plantain pollen. SPT to peanut, almond, Brazil nut and walnut were negative, whereas SPT to hazelnut showed a clearly positive reaction. A prick-to-prick test with roasted macadamia (Nutfields GmbH, Dietzenbach, Germany) showed a positive reaction, whereas SPTs in five controls were negative. Total serum IgE was 36.9 kU/l, and mast cell tryptase was normal. Specific IgE (CAP-RAST, Pharmacia Inc., Uppsala, Sweden) were negative to almond and macadamia nut, and positive for hazelnut (0.6 kU/l).

A 34-year-old man repeatedly developed severe oral burning, itching and swelling after eating hazelnut, walnut, Brazil nut, almonds and macadamia nuts, while tolerating peanut and cashew nut. He had a history of seasonal allergic rhinitis, contact urticaria to latex and oral itching when eating raw celery, apple, kiwi and tomato.

Positive tests were observed to tree pollen (birch, alder, hazel, ash, beech, oak), rye grass and sorrel pollen, as well as to latex. SPT to peanut, almond, hazelnut, Brazil nut and walnut were positive, whereas SPT to cashew nut showed a negative reaction. A prick-to-prick test with roasted macadamia was positive. Total serum IgE was 60 kU/l, and mast cell tryptase level was slightly elevated. Specific IgE to latex were 1.7 kU/l and negative to peanut, almond, hazelnut, Brazil nut, walnut, cashew nut and macadamia nut.

Three cases with anaphylaxis to macadamia nut (2–4), and a 1-year-old boy, who had suffered from erythema and periorbital angioedema after inadvertently putting a macadamia nut into his mouth (5) have been previously reported.

SPT with fresh macadamia nut was positive in all four subjects (2–5). In one patient, strong binding by IgE to a protein of 17.4 kDa from both raw and roasted extracts was shown (2). While SPT was also positive in our patients, macadamia nut-specific IgE were negative, comparable with high false-negative rates as, e.g. in peanut allergy (6). However, specific IgE to hazelnut were slightly elevated to 0.6 kU/l in our first patient and 1.07 AEU/ml in another individual (2). As many of the proteins responsible for severe allergic reactions to tree nuts share the feature of a general resistance to proteolysis and denaturation, the consumption of tree nut (and peanut) oils may be a risk for patients, depending on the method of processing (7).

In conclusion, even the 'queen of nuts' may cause serious allergic reactions. A possible cross-reactivity to other nuts, particularly hazelnut, should be considered. Moreover, further evaluation of recombinant molecules as well as development of hypoallergenic forms may provide interesting diagnostic and treatment options in potentially life-threatening nut allergy.

*Allergy Unit
 Department of Dermatology
 University Hospital
 CH - 4031 Basel
 Switzerland
 Fax: + 41 61 265 48 85
 E-mail: andreas.bircher@unibas.ch

Accepted for publication 3 April 2004
 Allergy 2005; 60:130–131
 Copyright © Blackwell Munksgaard 2004
 DOI: 10.1111/j.1398-9995.2004.00615.x

References

1. Roux KH, Teuber SS, Sathe SK. Tree nut allergens. *Int Arch Allergy Immunol* 2003;**131**:234–244.
2. Sutherland MF, O'Hehir RE, Czarny D, Suphioglu C. Macadamia nut anaphylaxis: Demonstration of specific IgE reactivity and partial cross-reactivity with hazelnut. *J Allergy Clin Immunol* 1999;**104**:889–890.
3. Pallares DE. Allergy to macadamia nut. *Ann Allergy Asthma Immunol* 2000;**85**:385–386.
4. Häberle M, Hausen BM. Soforttyp-Allergie nach Genuss von Macadamia-Nüssen. *Allergo J* 2002;**11**:S42.