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Exercise-induced anaphylaxis related to cuttlefish intake

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Abstract A 14-year-old girl suffered from exercise-induced anaphylaxis associated with eating cuttlefish. She was advised to avoid the precipitating food 6 h before exercise. No further attack occurred.

Conclusion It should always be considered that foods can predispose exercise-induced anaphylaxis. Precipitating food should be identified by challenge test.

Key words Exercise-induced · Challenge-test · Cuttlefish

Abbreviation EIAN exercise-induced anaphylaxis

Introduction

Exercise-induced anaphylaxis (EIAN) is a form of allergy to physical exertion [8]. In some cases the ingestion of a particular food [6] or of a meal [7] prior to exercise is required to provoke EIAN. We describe a patient in whom the ingestion of cuttlefish was a triggering factor in a subsequent adverse reaction to strenuous exercise.

Case report

A 14-year-old girl developed dyspnoea, with a “feeling of throat constriction”, progressive facial and neck swelling, hoarseness, diffuse urticaria and pruritus, after playing volley ball for 15 min. One hour before the attack, the patient had eaten wheat, tomatoes, potatoes, peanut oil, and cuttlefish (*Sepia officinalis*). Cuttlefish belongs to the cephalopods, which also includes squid and octopus.

She complained of atopic dermatitis, urticaria, allergic rhinitis and asthma due to mites and grass hypersensitivity. Her mother suffered from asthma and eczema in childhood. She had never previously experienced adverse reactions in response to a similar exercise, the intake of foods in the absence of exercise or increase in core body temperature. Additional factors favouring EIAN such as drug intake, weather conditions, menstrual cycle, lack of sleep, fatigue [1, 3] were not reported. She had no dental amalgam [4].

Skin prick tests (Bayropharm, Milan, Italy) and RASTs (Pharmacia, Uppsala, Sweden) to inhalants and foods, including crustacea and shellfish were carried out and revealed reactions to peanut, crab, lobster, mussel, grass, *Dermatophagoides pteronissinus* and *D. farinae*. Prick + prick tests with fresh cuttlefish, squid, octopus, clam and shrimp were positive. RAST revealed class 3 for shrimp, *D. pteronissinus*, *D. farinae* and class 2 for lobster. Total serum IgE level was 91 IU/ml (PRIST, Pharmacia, Uppsala, Sweden).

The girl performed exercise tests after 12 h of fasting, 1 h after a meal which did not contain suspected foods and 1 h after eating each suspected food. The exercise test consisted of indoor free running for 6 min increasing heart rate to at least 170 beats/min. Lung function was measured with a computerised spirometer (Microloop, Markos). Blood pressure was monitored before and after exercise tests. Exercise tests were performed on separate days. Parents gave their informed consent.

Exercise tests performed on fasting, after taking a meal without suspected foods and after intake of tomatoes, peanut, chips or pasta were negative. Two minutes after the end of exercise following eating cuttlefish, pruritus of the throat and tongue appeared immediately followed by rhinoconjunctivitis and cough, which progressed to dyspnoea, diffuse urticaria, swelling of the face and neck, hoarseness and wheezing. The girl was unable to perform spirometric tests because of these respiratory symptoms. Blood pressure decreased from 120/80 mm Hg, to 100/60 mm Hg. The episode resolved after the patient received oxygen, inhaled β_2 -agonists, antihistamines, fluids, corticosteroids IV and adrenaline SC.

The girl refused to perform further exercise tests after food ingestion. Therefore, she was advised to avoid not only cuttlefish but also other cephalopods, shellfish and crustacea, because of possi-

ble cross-reactions, 12 h before exercise. No further episode of EIAN has occurred in the last year.

Discussion

The presence of cuttlefish-dependent EIAN is demonstrated in this case. Our study shows that careful questioning and skin prick test results may help to establish the diagnosis. The role of a particular food in predisposing the attack has been ascertained by food-exercise combination challenge.

In this study, EIAN was distinguished from cholinergic urticaria since cutaneous lesions were not elicited by an increase in core body temperature [2]. As exercise test on fasting was negative, exercise-induced asthma was excluded.

Crustacea and shellfish have common determinants [5]. Our findings of positive skin prick tests or RASTs to these foods may be explained by cross-reactivity with cuttlefish, which has close phylogenetic relationship to shellfish. Assessment of clinical hypersensitivity is needed to prescribe a diet, but the patient refused to perform further exercise tests.

Exercise without prior food ingestion increases histamine levels in some patients both with EIAN [3] and with food-dependent EIAN [2]. Moreover in a few cases, plasma histamine concentration was higher after the food-exercise combination challenge than after the exercise challenge alone [3]. These observations suggest that food-dependent EIAN is associated with mast cell degranulation [2], but the mechanisms are unknown. Our patient had an IgE-mediated hypersensitivity to cuttlefish. This sensitivity may become clinically significant with exercise which enhances mediator release from mast cells.

Patients with EIAN must be instructed to discontinue exercise at the first signs of symptoms. They should exercise carrying adrenaline and with a partner familiar with its administration. Physical practice is thought to be permitted with patients who avoid trigger foods for at least 12 h before exercise [9] or favouring a meal 6–8 h previously [7]. However, an interval of up to 24 h between food intake and symptom-inducing exercise has been reported [6]. Further studies are needed to clarify this aspect. Paediatricians should always consider that foods can predispose EIAN and perform challenge tests to identify favouring foods in an adequate setting.

References

1. Añibarro B, Dominguez C, Diaz JM, Martin MF, Garcia-Ara MC, Boyano MT, Ojeda JA (1994) Apple-dependent exercise-induced anaphylaxis. *Allergy* 49:481–482
2. Casale TB, Keahey TM, Kaliner M (1986) Exercise-induced anaphylactic syndromes: insights into diagnostic and pathophysiologic features. *JAMA* 255: 2049–2053
3. Dohi M, Suko M, Sugiyama H, Yamashita N, Takodoro K, Juji F, Okudaira H, Sano Y, Ito K, Miyamoto T (1991) Food-dependent exercise-induced anaphylaxis. A study on 11 Japanese cases. *J Allergy Clin Immunol* 87:34–40
4. Katsunuma T, Iikura Y, Nagakura T, Saitoh H, Akimoto K, Akasawa A, Kindaichi S (1990) Exercise-induced anaphylaxis: improvement after removal of amalgam in dental caries. *Ann Allergy* 64:472–475
5. Martino M de, Peruzzi M, Luca M de, Guarino Amato A, Galli L, Lega L, Azari C, Vierucci A (1993) Fish allergy in children. *Ann Allergy* 71:159–165
6. Maulitz RM, Pratt DS, Schocket AL (1979) Exercise-induced anaphylactic reaction to shellfish. *J Allergy Clin Immunol* 63:433–434
7. Novey HS, Fairshier RD, Salness K, Simon RA, Card RA (1983) Post-prandial exercise-induced anaphylaxis. *J Allergy Clin Immunol* 71:498–504
8. Sheffer AL, Austen KF (1980) Exercise-induced anaphylaxis. *J Allergy Clin Immunol* 66:106–111
9. Tilles S, Schocket A, Milgrom H (1995) Exercise-induced anaphylaxis related to specific foods. *J Pediatr* 127:587–589

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