

Food Dependent Exercise Induced Anaphylaxis or Exercise Induced Anaphylaxis?

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INTRODUCTION

Food dependent exercise induced anaphylaxis (FDEIA) diagnosis requires the patient to be independently tolerant of both exercise and the responsible food. The current incidence of FDEIA in children is uncertain. Different foods have been described as the cause of the reactions, including: wheat products; shell-fish; vegetables; fruits; nuts; egg; mushrooms; corn; garlic; meat; and rice. Triggering factors include foods, exercise, patient's general condition, drugs, alcohol, and seasonal conditions.¹

The symptoms of FDEIA vary in severity but fatalities are rare. The most commonly seen symptoms consist of skin and respiratory manifestations, abdominal pain, fatigue and loss of consciousness. However, we believe there to be some overlapping cases². Here, we report on a patient who suffered from exercise induced asthma (EIA) but also has FDEIA.

CASE REPORT

A 15-year-old boy was admitted to our paediatric allergy and asthma unit because of recurrent episodes of generalized urticaria and itching, weakness, dyspnoea, and choking sensation in throat. He was treated with antihistamines, supplementary oxygen, nebulised salbutamol and methylprednisolone in emergency departments and usually recovered within 3 hours. These events took place after playing soccer but each time he had eaten peanut and hazelnut approximately half an hour before the episode. He had also been experiencing dyspnoea with vigorous physical activity. He could eat peanut and hazelnut without subsequent physical exertion. There was no family history of allergic disease or atopy. The clinical examination was negative, and no abnormality was found in the routine laboratory parameters. Skin prick tests performed with a standard series of inhalant and food allergens revealed positive reactions to hazelnut (4 mm) and peanut (7 mm) (histamine 7 mm, saline control 0 mm). Total IgE was 40 kU/L. Specific antibodies to hazelnut and peanut were borderline positive (0.51 and 0.67 kU/L, respectively). An open oral challenge test with hazelnut in progressively increasing doses every 20 minutes up to 100 g was negative. After fasting for 8 hours, an exercise challenge test was performed in the morning. He experienced a mild dyspnoea, which resolved spontaneously, but did not develop urticaria or symptoms of laryngeal oedema. His forced expiratory volume in 1 second (FEV₁) decreased to 12 % after running 6 min on the treadmill and his exercise provocation test was considered positive. Because of convincing history, anaphylactic nature of reaction and his parents' refusal of a double-blind placebo-controlled food exercise challenge to hazelnut, we were unable to perform the double-blind challenge. The patient

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was instructed to avoid hazelnut and peanut in the future, but 2 months later he experienced another anaphylaxis after exercise before which he had eaten chocolate with hazelnuts.

DISCUSSION

Anaphylaxis is defined as “a serious allergic reaction that is rapid in onset and may cause death”.³ The most common causes of anaphylaxis in children are foods, medications, venom, blood products, immunotherapy, latex, vaccines, and radiographic contrast media. Rarely, it may be induced by physical factors such as exercise.

Exercise-induced asthma (EIA) is a form of physical allergy in which exercise precipitates attacks of anaphylaxis and occurs independently of food ingestion. Patients with EIA experience a sense of warmth, flushing, generalized urticaria followed by airway obstruction and signs of shock. Since our patient did not experience anaphylaxis each time he exercised, we concluded that EIA was not the precise diagnosis.⁴

In FDEIA, the symptoms take place only in association with ingestion of certain foods preceding vigorous exercise. Sometimes mild exercise may trigger FDEIA. The mechanisms by which exercise induces FDEIA are controversial. IgE cross-linking by a particular food allergen in combination with exercise lowers the threshold of mast cell degranulation, resulting in histamine release and progression of allergic symptoms.⁴ Furthermore, exercise enhances the absorption of allergens from the gastrointestinal tract in their improperly digested or undigested forms.¹ Exercise itself is an important cause of asthma in people who have heightened bronchial reactivity, resulting in cough, wheezing, and dyspnoea. A selected

group of asthmatic patients, especially those with EIA, may give exaggerated response as anaphylaxis to foods to which they are atopic but at other times are tolerant. The exercise provocation test of our patient was positive indicating EIA but he experienced recurrent anaphylaxis because of strenuous physical activity before which he had consumed hazelnuts. Despite the low level of his specific IgE for hazelnut, it is not necessary to have high specific IgE for causative food supporting the pathogenesis of FDEIA.⁵ Separation of known food allergen for up to 4 hours prior to vigorous exercise is the main strategy for the prevention of FDEIA.²

In conclusion, FDEIA may be seen in a minority of patients with EIA. Patients with EIA who have atopy to food antigens, even with low specific IgE levels for that food may deserve further attention for FDEIA since exercise may decrease their tolerance threshold. Detailed clinical history and a careful evaluation are extremely important for diagnosis.

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