An Unusual and Rare Case of Food-dependent Exercise-induced Anaphylaxis Caused by Ingestion of Potatoes

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INTRODUCTION

Food-dependent exercise-induced anaphylaxis (FDEIA) is an unusual and under-recognized form of exercise induced anaphylaxis, which usually occurs if exercise takes place within a few hours after ingestion of sensitizing food, but in some cases may also arise if food follows the exercise. We report a case of a 31-year-old woman who presented to our Department with a history of repeated episodes of acute allergic reactions, triggered by physical activity, after consumption of various vegetables and legumes. This is the first described case of FDEIA in Bulgaria. We believe that there are many other undiagnosed cases, because for the correct recognition of this condition, it is essential to be familiar with the symptoms and combination of factors.

CASE REPORT

A 31-year-old woman presented to our Department for analysis of total and food-specific IgE antibodies. She reported three episodes of allergic reactions, associated with the ingestion of some vegetables and legumes (tomatoes, potatoes, rice and lettuce), while dancing. In all the attacks her symptoms appeared within a few minutes after initiation of dancing and 30 - 40 minutes after ingestion of a specific food. Her family history for atopy was negative. She did not have any known allergies to foods or medications and she tolerated any of the triggering foods, if it was not followed by exercise. Her first episode happened in April 2013 and started...
during the Latino dancing lessons, 30 minutes after ingestion of tomato salad. She described a burning sensation followed by appearance of widespread urticarial lesions (on the whole body), swelling of eyelids, palms and soles, palpitation and fever. Four weeks after the first episode she had a second, which started 15 minutes after initiation of dancing and 40 minutes after consumption of potatoes with rice and lettuce. Faintness, vomiting and abdominal pain were added to the previous symptoms. She avoided the suspected foods for four months and she did not have another new attack, although she did not stop dancing. After that, rice and potatoes were reintroduced in her diet. The third episode happened the same day and it was identical, as time of initiation of the symptoms and presentation, as the second attack. Other common features in all attacks were the extreme temperature and humidity in the dancing hall.

The total serum immunoglobulin E (IgE) concentration, measured by electro-chemiluminescence immunoassay, was 141.3 IU/ml (reference range up to 100 IU/ml) and ImmunoCAP (Pharmacia, Uppsala, Sweden) and Immunoblot (Euroimmun, Germany) assays were performed to detect specific IgE antibodies to tomato, potato and rice. It was not possible to analyze specific IgE for lettuce. Negative results (< 0.35 kU/L) were obtained for tomato and rice, and positive for potato (0.98 kU/L).

Additional blood tests showed: antinuclear antibodies (ANA), using indirect immunofluorescence, revealed fine granular pattern in borderline titer 1:100; antineutrophil cytoplasmic antibodies (ANCA), antibodies to tissue transglutaminase (anti-tTG), rheumatoid factor (RF), Helicobacter pillory were all negative. The serum levels of IgG, IgA, IgM, complement fractions (C3, C4) and C1-inhibitor were within the reference ranges.

We proposed to our patient a food-exercise provocation test, in order to demonstrate with certainty whether potato, or another of the indicated foods, were responsible for FDEIA in her case, but she refused, because she suspected that she might be pregnant.

DISCUSSION
The first case report of FDEIA was described by Maulitz R.M. and colleagues in 1979, as an allergic reaction caused by running after ingestion of shellfish. In the majority of the patients with FDEIA IgE antibodies, specific to a sensitizing food, have been detected. For this reason, FDEIA is considered an IgE-mediated reaction. A wide variety of foods have been determined as causative for FDEIA. In Europe the most common foods implicated are tomatoes, peanuts and cereals. Wheat, in particular omega-5 gliadin, is the most frequent allergen in Japanese patients. Other foods that are capable of triggering FDEIA are seafood (particularly shellfish, but also crab, oyster, shrimp), some vegetables, fruits, meat, food contaminated with aeroallergens, such as house dust mite, mushrooms, alcohol, etc. Other factors that can influence the development of FDEIA may include extreme temperature, humidity, aspirin use or NSAID.

In the first attack, our patient experienced allergic symptoms after consumption of raw tomatoes followed by dancing, but there were no specific IgE antibodies to tomatoes. In the second and third attacks, the symptoms appeared after consumption of potato, rice and lettuce followed by dancing, but the results were positive only to potato.

Potatoes have been often considered a safe food, as to be included in diets for food intolerance. The occurrence of allergy to cooked or raw potato is very rare and uncommon, in contrast to the above-mentioned foods. It is usually reported in atopic children. In adults it has been described mainly as a cause of oral allergy syndrome in patients with pollen allergy and only one report mentions potatoes as a triggering factor for FDEIA.

Potatoes and tomatoes belong to the Solanaceae family, which also includes eggplants, peppers and tobacco, among others. Potatoes contain a number of allergenic compounds of which the most prevalent is patatin (Sol t1), found in other plants of the family. People having allergic symptoms with one member of the family, can also become allergic to other members due to cross-reaction. A protein of 44-46 kDa was shown to be common for potato, tomato and latex. This protein was reported to probably correspond to patatin - the major cross-reactive potato allergen. In our case, the possibility of Solanaceae sensitivity could explain the symptoms and discrepancies in the specific IgE results for potato and tomato. We believe that potato allergens are responsible for the cross-reactivity and exercise induced symptoms in our patient, in combination with extreme temperature and humidity.

This case demonstrated that, although the allergy to potato is uncommon and potato is considered a safe food, it was the culprit food for our patient’s exercise induced symptoms.
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Анафилаксия, зависимая от приёма пищи и вызванная физической активностью (Food-dependent exercise-induced anaphylaxis - FDEIA), является необычной и редко распознаваемой формой анафилаксии, вызванной физической активностью, которая обычно проявляется, если упражнения выполняются в течение нескольких часов после приёма пищи, вызывающей чувствительность, но в некоторых случаях может появиться в случае, если пища принимается непосредственно после физической активности. Мы представляем случай 31-летней женщины, которая была представлена на нашей кафедре с анамнезом повторяющихся острых аллергических реакций, вызванных физической активностью, после употребления различных овощей и бобовых. Это первый описанный случай FDEIA в Болгарии. Мы считаем, что существует много других недиагностированных случаев, поскольку для правильного диагноза этого состояния важно, чтобы специалисту были известны симптомы и комбинация факторов.