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Unusual allergy to soy appeared in adult age

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Summary
A case of adult onset severe soy allergy is discussed. The allergen protein involved did not correspond to those presently detectable by commercial diagnostic means, but was not identified, possibly due to the insufficient level of specific IgE. Fresh foods and commercial food extracts remain an invaluable tool to support the diagnosis of food allergy, both in-vivo and in-vitro.

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Introduction

Soy is one of the most relevant foods involved in allergic reactions, being considered among the 14 major allergens in the European Union (1) and included in the WHO list of the "Big eight allergenic foods" (2). Soy allergy largely prevails in infancy / childhood, where it appears to be a transient phenomenon (3). We report an unusual case of allergy to soy that appeared in adult age.

Case report

A 69 year-old man presented in February, 2015, at the outpatient allergy department of the Clinica San Carlo, in Paderno Dugnano. About 20 years before, he experienced an episode of generalized urticaria / angioedema and collapse about 10' after eating a commercial cracker with soybean. That episode required an immediate treatment in the Emergency Room. Some years ago, the man had another similar reaction some minutes after eating a "pizza with (unknown) vegetables"; again, the episode subsided after treatment at the Emergency Room. Finally, about 1 month before the visit, he experienced severe abdominal pain, vomiting, and diarrhea and generalized urticaria about 15 minutes after eating a risotto with many vegetables. This time, symptoms subsided spontaneously about 30 minutes after vomiting. The man ate regularly salad, celery, carrot, fennel, legumes, and all sorts of fruits including nuts without any problem. Skin tests with a large panel of commercial food extracts (ALK/Abellò, Madrid, Spain), including egg, cow's milk, shrimp, peanut, wheat, barley, rice, soy, walnut, hazelnut, tomato, pork meat, codfish, carrot, orange, peach, celery, almond, strawberry, along with Anisakis simplex demonstrated an intense reaction to soy only (wheal size 6 x 6 mm). Probable soy allergy was diagnosed, the patient was recommended to

Table 1 *- Known soy allergens.*

Gly m 1	Hydrophobic seed protein	8.3 kDa	
Gly m 2	Defensin	8 kDa	
Gly m 3	Profilin	14 kDa	
Gly m 4	Pathogenesis related protein group 10	17 kDa	Homologous Bet v 1
Gly m 5	7S vicilin (b-conglycinin)	48 kDa	
Gly m 6	11S Globulin (glycinin)	55 kDa	Homologous Ara h 3
Gly m 7	Seed-specific biotinylated protein	66 kDa	
Gly m 8	2S albumin	12 kDa	Homologous Ara h 2/6
Gly m lectin	Agglutinin	30.9 kDa	
Gly m Bd30K/P34	Cysteine protease	34 kDa	Homologous Act d 1
Gly m CPI	Cysteine protease inhibitors	25 kDa	
Gly m EAP	Embryonic abundant protein	60 kDa	
Gly m TI	Trypsin inhibitor	21,5 kDa	
Gly m Bd 28K/P28	7S vicilin	26 kDa	Homologous Ara h 1

carefully avoid every food product containing soy, and auto-injectable epinephrine was prescribed. The diagnostic workup continued in vitro. Specific IgE to whole soybean extract was detected by ImmunoCAP (Thermo-Fisher Scientific, Uppsala, Sweden): 1.07 kU/L (n.v. < 0.1 kUA/L), and a direct ELISA carried out at Lofarma laboratories using an in-house soy extract showed an absorbance of 1465 OD (normal control serum: 402 OD). However, surprisingly enough, no IgE reactivity to rBet v 1 (homologous to Gly m 4), rGly m 5, and rGly m 6 was found on ISAC microarray (Thermo-Fischer Scientific). Similarly, patient's serum did not show any IgE reactivity to profilin (rBet v 2), and to the 4 potentially cross-reacting peanut allergens, Ara h 1, Ara h 2/6, Ara h 3, and Ara h 9. In order to detect the soy allergen involved in this case, an immunoblot analysis was performed at Lofarma laboratories but, probably due to the limited concentration of specific IgE in serum, it scored negative.

Discussion

Soy allergy largely prevails in children, and the prevalence of soybean allergy is probably higher in the Eastern Countries than in Europe or in the US (4). Many soy allergens have been described so far (5-7; **table 1**) but only three of them, Gly m 4, Gly m 5, and Gly m 6, are available for routine component resolved diagnosis. Gly m Bd 30K, Gly m Bd 28K, and Gly m 5 have been described as the immuno-dominant allergens in soybean (8-12), and Gly m 5 and Gly m 6 have been associated with severe allergic reactions in Japanese children (13). The onset of soy allergy in adulthood is very rare. Our patient experienced his first allergic reaction when about 50 years old. Interestingly, he tolerated peanut, pea, bean, chickpea, string bean, and lentil well, and did not react to peanut on SPT, suggesting that the offending soy allergen did not cross-react to homologous allergens present in other members of the Leguminosae family. The clinical history strongly suggested sensitization to a heat-stable and pepsin stable allergen. Unfortunately, we were not able to identify the offending allergen protein, but only to exclude sensitization to four of the most common soy allergen. This rare case of adult onset soy allergy tells us once more that fresh foods and food extracts remain an invaluable tool to support the diagnosis of food allergy.

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