

THE RISK OF SYSTEMIC REACTIONS TO SKIN PRICK-TESTS USING FOOD ALLERGENS: CICBAA DATA AND LITERATURE REVIEW*

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SUMMARY: Prick-tests to foods are usually carried out as the first step in the diagnosis of food allergy. Severe anaphylaxis accounts for 4.9 % of allergies in children and occurs more frequently in adults, raising the possibility of systemic reactions to prick-tests in highly sensitized people. Several studies published in the literature have used commercial extracts. As for air-borne allergens, concentrations causing a skin reaction of 15 mm do not present a risk of systemic reactions. Prick-tests to native foods - prick-in-prick tests - have been less extensively studied. The CICBAA1 data, from 1,138 food allergic patients of all ages, cover 34,905 prick-in-prick tests to foods. The wheal of these prick-tests has been regularly registered. The risk of systemic reactions can be evaluated at 0.008 %. There were no severe reactions and anti-histamine and corticosteroid therapy were sufficient. These results are similar to those of the large study in 2000 carried out by Devenney in neonates (0.005%). A review of the literature reveals only a few severe reactions in adults. The authors draw attention to the necessary precautions: temporary contra-indication for skin prick-tests in children and adults with grade 3 or 4 asthma, with particular attention to such foods as all kinds of nuts, fish, etc.

Key-Words: Food allergy - Prick-in-prick tests - Systemic reactions.

INTRODUCTION

Prick tests with food allergens are carried out frequently, even in infancy. Severe food-induced anaphylaxis, according to a recent study may represent 4.9% of all food allergies in children (1) and far more in adults (2). The severity of such cases raises the issue as to whether prick tests may induce systemic reactions, including anaphylactic shock.

The risks related to prick tests, using standard commercial extracts with known concentrations of major allergens, have been widely studied. It has been shown that each ten-fold increase in allergen concentration corresponds to a 1.5 increase in wheal size. Therefore, if the first concentration used in a prick test produces doubtful results of under 3 mm, greater concentrations would produce wheals of 4.5 mm, 6.8 mm, 10.3 mm, 15.2 mm. According to Dreborg, this involves no risk of systemic reaction (3).

In food allergy, native foods are often used since few commercial extracts are available or have been standardized. Often, the possible presence of clinically significant allergens in commercial extracts is not known. It is established that aqueous extracts of fruits and vegetables have only moderate sensitivity. On the other hand, when testing with native foods, the true allergen concentration is not known, probably more important than in the commercial extracts, thus introducing an unknown parameter. Drawing on experience with skin-prick testing with common allergen extracts (air-borne allergens), Dreborg observed a variability in skin sensitivity ranging from 1 to 10,000 depending upon the individual (3). Skin prick tests may therefore induce a clinical reaction in more sensitive subjects. The aim of this study was to assess this risk factor with native foods, by comparing our experience with information in the literature.

Methods

Our data base from the CICBAA* includes 1138 individuals with food allergies, infants, children and adults allergic to at least one food as evidenced by prick tests, specific IgEs and oral challenge (single- or double-blind). These patients could be considered at the greatest risk of clinical reactions induced by skin-tests, since they were those allergic to at least one

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type of food and were simultaneously tested to 6 foods (infants) or to 25 foods and more (older children and adults). The data from 34,905 prick-in-prick tests have been recorded, with the size of the wheals.

Results

The most positive results were characterized by wheals over 12 mm and involved cashew nuts (33.3%), fish (24.7%), egg (21.9%) and peanut (18.1%).

Four systemic reactions were observed: one with labial angioedema, in an infant allergic to egg, and three with generalized urticaria on the back induced by cashew nuts, sesame and peanut. This represented 0.008% of all cases.

When a prick test was highly positive, routine treatment entailed application or massage with a dermal corticosteroid cream, sometimes oral antihistamines and corticosteroids, with the patient monitored closely, particularly when known to be asthmatic.

Review of the literature

The risk associated with airborne allergens and hymenoptera is extremely low (4) and has been estimated at 0.04% (5, 6).

Several studies have been carried out on food allergy using prick tests in infants and children. However a clear distinction between prick-tests to commercial extracts and prick-in-prick tests to native food is not always obtained.

➤ 1984: Sampson published 40 cases of young children with food allergy (including peanut) and commented on the greater value of prick tests. No accident was reported (7).

➤ 1985: Ménardo (Montpellier) reported the results of prick testing with milk and egg in infants under 4 months old: no accident was reported (8).

➤ 1991: Dreborg made a general review of prick tests used over many years and no accident was reported (9).

➤ 1994: Hatahet performed prick tests with peanut on 125 healthy infants aged less than 4 months and no accident was reported (10).

➤ 1996: all children aged of 1, 2 and 4 years (1,218) on the Isle of Wight were tested to peanut and no accident was reported (11).

➤ 1997: Rancé evaluated prick in prick tests with native foods (including peanut) in 430 children and concluded that native foods should be used for primary testing in the cases of peanut, egg and milk: no accident was reported (12). Mavroléon reported an

isolated case of systemic reaction where the wheal to peanut measured 20 mm (13).

➤ 1998: Moneret-Vautrin *et al* published their results on peanut allergy. Out of 142 cases, 93% were children. Prick in prick tests with roasted peanut did not induce a systemic reaction, even when the wheals were large (more than 15 mm) (14).

➤ 1998: Eigenmann and Sampson reported a large series of prick tests performed in children to determine and they reported no accident (15).

➤ 2000: Devenney (Sweden) reviewed all skin-prick tests carried out in a children's clinic between 1996 and 1998 and reported 6 cases of systemic reactions to native foods in infants under 6 months of age. The risk was estimated at 5.2 per 100,000 (0.005%) (16). In 2001, the author reviewed tests performed in duplicate. In 1,087 duplicate tests, where the first was positive, only 1.3% of the second tests were negative. He concluded therefore that there was no point in checking a positive test, since it could produce a systemic reaction in young children (although no accident was reported) (17).

➤ 2000: Cantani also noted the absence of systemic reactions in over 10, 000 children (18).

➤ 2002: In the "Archives de Pédiatrie", Karila, writing on behalf of P. Scheinmann's team, stated that (i) prick tests were a major diagnostic tool, (ii) the principal indication was to identify atopic infants and children, (iii) prick tests were useful for diagnosis of food allergy, (iv) there was no absolute contra-indication, and (v) prick tests were well standardized. He did not mention any complication related to prick tests (19).

➤ 2002: F. Rancé published a new series of 363 children who had prick-tests for peanut. She reported highly positive results (16 mm or more) but no accidents (20).

➤ 2003: Morisset *et al*. published a new series of 103 cases of children with peanut allergy, who had prick-tests with roasted peanuts. No accidents have been related (21).

➤ 2004: Hill (Australia) gave the results for prick tests with peanut and other foods in 467 children (90 were aged less than 2 years). No accidents have been related (22).

➤ 2005: A case of perennial rhinitis was reported. The origin was identified by an immediate skin reaction after eating maize corn flour. It involved strong sensitization to pollen and corn seed. Prick tests induced a systemic reaction. The rhinitis disappeared after an eviction diet (23).

ADULTS

Novembre described two cases of anaphylactic reaction in adults (fish and kiwi fruit). The first patient was only allergic to fish (anaphylactic shock after contact

with a fork that had been in contact with fish) and suffered anaphylactic shock after prick in prick tests with 6 different fish performed simultaneously. The second patient had an allergic reaction of moderate intensity lasting a few minutes after a prick test with kiwi (24). A more serious reaction occurred with a prick in prick tests in a young woman (25).

CONCLUSION

The risk of systemic reactions to prick-in-prick tests with native foods was evaluated at 0.008% in a series of 1 138 food allergic patients.

Though the risk is low, precautions should be taken: prick tests should not be carried out near blood vessels on the forearm where a food allergy with serious clinical reactions is suspected. Prick tests to fish and cashew nuts should be closely monitored in children. From a general viewpoint, one has to be aware that any investigation of cross-sensitization in one group (nuts, fish or Legumes) increases the number of prick tests with clinically relevant allergens, and the risk of cross-reactions. In such a case, prick tests should be carried out at 10-minute intervals and not simultaneously. Patients in a poor clinical condition such as asthmatic patients, grade 3 or 4, should not be tested.

In the future, recombinant allergens with known concentrations will be used. It will then be possible to modify concentrations, thus removing the current very low risk involved in prick-in-prick testing.

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