

Recurrent Peanut Allergy May Not Be Prevented by Continued Peanut Ingestion

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Established Facts

- Resolved ('outgrown') peanut allergy can recur in up to 8% of cases.
- The risk of recurrent peanut allergy is thought to be reduced by regular ingestion of peanut subsequent to resolution of peanut allergy.

Novel Insights

- A case is presented of recurrent peanut allergy occurring in the context of frequent peanut ingestion.
- Regular ingestion may not be an effective strategy for the prevention of recurrent peanut allergy.

Key Words

Allergy prevention • Peanut allergy • Tolerance, peanut

practice cannot guarantee freedom from recurrent peanut allergy, and it is important that patients and their families are aware of this.

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Abstract

Recurrent peanut allergy has been described in patients who have previously passed an oral food challenge [N Engl J Med 2002;347:1535–1536]. It has been suggested that recurrent peanut allergy might be prevented by regular ingestion of peanut subsequent to passing an oral food challenge [J Allergy Clin Immunol 2004;114:1195–1201]. We present a case that challenges this thinking by demonstrating that peanut allergy may recur during regular ingestion of significant doses of peanut protein. The case suggests that current

Introduction

Peanut allergy is the commonest cause of fatal food-induced anaphylaxis, and may be increasing in prevalence [1, 2]. It may develop during childhood or adulthood, and the early onset form resolves during childhood in up to 20% of cases [3, 4]. Early onset peanut allergy has been reported to recur after previous challenge-con-

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firmed resolution [5, 6]. The reasons for recurrence of peanut allergy after its apparent resolution are not clear, and the phenomenon of recurrent food allergy has only rarely been reported for other foods [7]. Recurrent peanut allergy has been associated with continued strict avoidance following negative food challenge, and new onset peanut allergy has also been described related to a period of strict avoidance [5]. It has therefore been suggested that those with resolved peanut allergy might be encouraged to consume peanut at least once every month to maintain immunological tolerance [5]. We report a case of recurrent peanut allergy despite continued peanut ingestion, which challenges the belief that regular peanut consumption can prevent peanut allergy recurrence.

Case Report

A 3-year-old girl with recurrent otitis media and specific antibody deficiency presented with a history of urticaria and angioedema following exposure to peanut. At 6 months she developed a truncal rash while being formula fed – her mother had eaten peanut and moistened the bottle teat in her own mouth prior to the feed. At 14 months she developed facial urticaria and angioedema within minutes of ingesting a mouthful of toast with peanut butter. Skin prick testing (SPT; GreerPick, Greer Laboratories, Durham, N.C., USA; peanut extract, Dome-Hollister-Stier, Spokane, Wash., USA) to peanut was positive with a 12.5-mm wheal and SPT to cashew, walnut, almond and sesame were negative. There were no further peanut exposures over the next 2 years, and repeat SPT to peanut at 3 years of age was negative with a 1-mm wheal. The girl underwent supervised open food challenge (OFC) to a total of 1 g peanut protein without reaction [8]. She continued to ingest up to 1.2 g peanut protein daily over subsequent weeks, as shown in table 1.

Eighteen days after supervised OFC ocular pruritis, erythema and angioedema were noted within minutes of ingesting 1.2 g peanut protein. A further 5 days later facial urticaria was noted within minutes of ingesting 0.1 g peanut protein. Six weeks later repeat SPT to peanut was positive with an 8-mm wheal. Repeat OFC at this time was also positive, with the development of generalized urticaria 10 min after a 0.1-gram dose of peanut protein. Sera taken at the time of peanut allergy resolution and at the time of peanut allergy recurrence were analyzed in parallel (UniCAP, Phadia, Sweden). Peanut-specific IgE levels were 0.01 kU/l at the time of negative SPT prior to OFC, and 0.19 kU/l after peanut allergy recurrence.

Discussion

We have described a case of recurrent peanut allergy despite ongoing peanut ingestion. The case suggests that continued consumption of peanut after a negative food challenge cannot reliably ensure that immunological tol-

Table 1. Pattern of peanut intake and symptom development subsequent to negative supervised OFC

Day after OFC	Dose g peanut protein	Symptoms
Supervised OFC	1.0	nil
1	0.6	nil
2	0.6	nil
3	1.2	nil
4	1.2	nil
5	1.2	nil
6	1.2	nil
7	1.2	nil
8	1.2	nil
9	0.0	nil
10	1.2	nil
11	0.0	nil
12	1.2	nil
13	0.0	nil
14	1.2	nil
15	0.0	nil
16	0.0	nil
17	0.0	nil
18	1.2	pruritis, erythema, angioedema
19	0.0	nil
20	0.0	nil
21	0.0	1.2 g offered but refused
22	0.0	nil
23	approx. 0.1	generalized urticaria

All peanut protein was ingested in the form of peanut butter.

erance to peanut is maintained – indeed such consumption may be capable of resensitizing the patient to peanut. It may be relevant that this child had a coexistent immune deficiency – specific antibody deficiency – which has previously been associated with increased risk of allergic disease [9].

One alternative interpretation of the case presented is that the patient’s peanut allergy did not ever resolve, because insufficient doses of peanut protein were administered during OFC to confidently exclude persistent peanut allergy. A common recommendation is for food challenges to include a top dose of 8–10 g of dry food (~4–5 g peanut protein if using peanut flour), as up to 5% of peanut-allergic individuals require a dose of >1.2 g peanut protein to elicit a reaction [10]. A negative challenge to lower doses may therefore result in a patient being mislabeled as food tolerant and at risk of a serious allergic reaction in the community [11]. A failure to fully exclude persistent peanut allergy is a possible explanation for the case described, but we believe that it is more like-

ly our patient had true resolution and recurrence of peanut allergy. This conclusion is supported by the changes seen in peanut-specific IgE levels measured by SPT and serological testing. Studies from our department have shown that a SPT wheal size of ≤ 1 mm has a 98% negative predictive value for peanut allergy, and a SPT wheal size of 8 mm has a 100% positive predictive value for peanut allergy [12, 13]. Although the highest dose of peanut protein used during OFC (1 g peanut protein) was lower than that recommended by many authorities for the exclusion of food allergy, published series of threshold doses suggest that this dose or the subsequent 1.2 g doses administered at home are sufficient to elicit signs of allergic reaction in approximately 95% of children with peanut allergy [10, 14].

Peanut allergy recurs in up to 8% of cases after resolution, and the mechanisms underlying this recurrence are not clear. The dominant paradigm is that in these situations the apparent resolution of peanut allergy is a temporary state of immune tolerance which can be broken if peanut ingestion ceases for sufficient time. This temporary state of immune tolerance to food allergens has recently been induced experimentally, with subsequent strict exclusion of the food leading to a loss of tolerance [15]. The phenomenon has not to our knowledge been definitively reported to occur in the context of OFC. Our case and that

of Hu et al. [7] suggest an alternative explanation for some cases of recurrent food allergy – that resensitization may occur during ingestion of high doses of the relevant food, rather than exclusively occurring in relation to low-dose intermittent ingestion or strict exclusion.

Until now strict avoidance of peanut subsequent to negative OFC has been thought to increase the risk of peanut allergy recurrence, and regular ingestion of higher doses has been thought to maintain immunological tolerance to peanut. The case described highlights the possibility that outside of specific oral tolerance induction protocols, the regular ingestion of peanut may not be sufficient to prevent recurrent peanut allergy. Indeed regular peanut ingestion may be capable of breaking established immune tolerance to peanut. Patients with resolved peanut allergy and their families need to be aware that continued peanut intake cannot guarantee continued remission of their peanut allergy.

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