



Nutrition therapy in peanut allergy

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Summary

Background The diagnosis “peanut allergy” is often frightening for affected persons and their families because it is perceived as life-threatening much more often than allergies to other foods. In order to be able to realistically assess risks, alleviate or dispel emerging concerns, and effectively counteract the feeling of being powerless over this diagnosis, good education, integration of affected families into existing structures, and their support in everyday life are needed.

Results and discussion Effective disease management in (peanut) allergy is based on four pillars: (a) a confirmed diagnosis, (b) knowledge about the occurrence of peanut—especially in processed form, (c) situational risk assessment as a basis for individual avoidance strategies that promise the greatest possible safety, but at the same time do not restrict the quality of life more than necessary, and (d) learning to deal adequately with unforeseen incidents (emergency management) to avoid severe allergic reactions.

Conclusion This requires close cooperation between pediatricians or allergists, allergy-experienced nutritionists or dietitians and ideally psychologists. Furthermore, the membership of a patient organization and the participation of affected persons and their environment in training measures (e.g. anaphylaxis training) is useful.

Keywords Disease management · Education · LMIV · Risk assessment · Avoidance

Not every peanut sensitization is equivalent to an allergy

Often, the detection of peanut sensitization already leads to a recommendation of abstinence—regardless of the reason for the allergy test. While detection of sensitization based on a history of suspicion toward peanut allergy may be interpreted as corroboration of that suspicion, nondirected testing is more likely to result in false-positive findings [1]. However, an avoidance recommendation made as a result of silent sensitization can, in the worst case, lead to a manifest peanut allergy, as the LEAP study (LEAP, Learning Early About Peanut Allergy) has impressively shown [2]. Referral to an allergy-experienced nutritionist or dietician (www.allergie-wegweiser.de) is therefore reasonable for two different constellations [3, 4]:

- In cases of unclear suspicion, in order to substantiate or invalidate a suspected diagnosis by means of a specific dietary history and, if necessary, a dietary and symptom protocol.
- If there is a clear suspicion, to initiate nutritional therapy.

If a suspicion cannot be clearly substantiated, a short-term diagnostic diet (maximum 7–14 days) followed by an oral provocation test is necessary to gain clarity about the clinical relevance and to prevent unnecessary avoidance approaches.

Goals of nutrition therapy in peanut allergy

The goals of therapeutic nutritional counseling go far beyond the necessary information about the presence of the triggering food. It is always also a matter of individually targeting avoidance strategies in order to maintain an existing tolerance, to ensure the supply of all nutrients, and to maintain or restore a high quality

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of life through successful disease management in everyday life [5, 6]. Because peanut is not a staple food and, unlike milk, for example, is not a major source of certain nutrients, assurance of adequate nutrient supply is not a primary goal in this food allergy. In contrast, in peanut allergy, which is often highly anxiety-inducing, the greatest challenge is to address the concerns and fears of affected individuals and their families, to place the individual history in the context of current knowledge, and to provide the nutritional therapy tools to implement effective disease management [7].

Peanut—an inevitable anaphylaxis trigger?

Although other foods cause anaphylactic reactions, this most severe form of allergic reaction is primarily associated with peanut [8, 9]. This is correct in that peanut is a major cause of severe allergic reactions and a two-phase reaction, in which a second allergic reaction follows in more than one-fifth of cases even after more than 12 h, is significantly more common in peanut allergy compared with the other triggers [10]. Nevertheless, peanut allergy does not necessarily manifest as an anaphylactic reaction with severe symptomatology: An international evaluation of more than 1600 peanut provocations in children showed that in this clinical setting, anaphylactic reactions occurred in only 10% of peanut allergic patients. Interestingly, anaphylactic reactions increased with increasing amounts of peanut administered. Thus, only 9% of anaphylaxis was induced at lower provocation doses of 25–100 mg peanut, while 27% of anaphylaxis was observed at amounts between 200 mg and one gram (one peanut), and 40% at amounts between 5 and 20 g [11]. Among these, anaphylaxis—especially to small amounts—occurred significantly more often in older children.

All these observations are in contradiction with a recently published study showing that the level of distress in younger children is perceived as high by caregivers regardless of the severity of peanut allergy, whereas a reduction in quality of life in older children seems to affect only the highly allergic ones [12]. Since two or more reactions in the previous year and parental anxiety were significant predictors of high levels of suffering in childhood, it can be speculated that better dietary involvement, not only could prevent reactions, but also reduce parental anxiety and increase children's quality of life.

Avoidance of peanut—possibilities and limits of the Food Information Regulation

The ring binder “Dietetics in Allergology” provides a repeatedly revised and updated basis for individual counseling of affected persons and their families [13]. A large part in the information regarding the occurrence takes the allergen labeling, which is regulated

by the mandatory allergen information according to the EU-wide (EU, European Union) Food Information Regulation (LMIV)—VO (EU) 1169/2011 [14]. It provides the basis to recognize peanut in processed products and consequently to avoid it. If peanut or a product made from it is used as an ingredient or processing aid in a food, it is compulsory to provide information about this on both prepackaged and bulk goods. However, training for food manufacturers and processors as demanded by the German Allergy and Asthma Association (DAAB) and the German Society for Allergology and Clinical Immunology (DGAKI) is not compulsory so far, so that the actual implementation of allergen information for loose goods is very heterogeneous in practice. Satisfactory information regarding the presence of peanut in bulk products is often dependent on the level of knowledge of the respective operator [15, 16].

In contrast, unintentional presence of allergens (so-called “traces”) are not covered by the mandatory allergen information. Not only are food manufacturers free to decide whether to provide information on this at all, but no framework conditions have yet been defined for the use of “trace” labeling—neither for the type and manner of labeling (e.g., the wording) nor with regard to limit values or maximum amounts. Thus, warnings such as “may contain traces of peanut”, “may contain peanut” or “produced in a company that also processes peanuts” can conceal exactly the same amount of peanut contamination. This is because the wording gives no indication of the level of contamination, so that the entire range of contamination is possible in the correspondingly labeled product—from no contamination, to amounts of peanut that would not trigger an allergic reaction in a large proportion of allergy sufferers, to whole peanuts. This makes the informed purchasing decision intended by the EU Commission for all consumers more difficult and prevents a safe food choice for consumers with peanut allergies, which has also been criticized several times [17–19].

In addition, allergic consumers are currently not informed by the authorities (e.g. via www.lebensmittelwarnung.de) if food monitoring finds health-relevant amounts of allergens in products that are due to an unintentional presence of allergens. A recall or officially ordered information is only issued if unlabeled allergens are discovered as an ingredient, but not as an unintentional presence of allergens (“trace”)—regardless of the amount detected. Since it is irrelevant for allergic consumers whether an allergic reaction occurs due to an ingredient or a so-called “trace”, the DAAB has been advocating for years that public information be provided in both cases [19]. To this end, it has established the newsletter “DAAB Allergen Warnings” for patients, and health professionals, which, however, currently relies on voluntary information from industry or consumers regarding unlabeled “traces.”

Even if the current situation is not satisfactory, nutritional counseling can play a significant role in providing reassurance to those affected. Even if it may sound trivial, one of the most important courses of action is still to read the list of ingredients or to ask for or read up on the allergen information in the case of loose goods. A 2017 study showed that nearly half of anaphylactic reactions occur at home, and one-fifth each occur in restaurants and daycare/school settings [20]. Prepackaged foods triggered the anaphylaxis in one third of the cases—mostly because the list of ingredients was not read. In a follow-up study after oral provocation with peanut, a total of 68 unintentional reactions were recorded in 17 of 41 peanut allergic patients within three years [21]. Looking at the most severe reaction in each of these 17 patients, we find that six foods were packaged foods with peanut as an ingredient, two carried a warning/“trace” peanut label, and eight were unpackaged. In one case, reactions were triggered by contaminated potato chips; however, only subjective symptoms occurred in this case.

Because (allergenic) ingredients and unintentional allergen presence can change, it is necessary to always read ingredient lists and warning labels—even if the foods are “well-known”. In addition, dietary advice can include strategies on how to improve management of peanut allergy by contacting food manufacturers in order to obtain information about their allergen management. This not only has the effect of obtaining better knowledge about suitable and unsuitable foods, but also sends a signal to manufacturers that the current allergen information is not sufficient for the target group.

In addition, education on how to interpret a warning, what it says or can say and what it does not say or does not have to say (see above) is crucial for creating more safety when shopping.

Consideration of individual factors

In addition to knowledge about the presence of peanut, individual factors should also be taken into account in order to adapt avoidance strategies to the individual concerned. For example, in some cases, other legumes may be perceived as allergens via cross-reactions [22]. Since such cross-reactions are not the rule, but may only be relevant in individual affected persons with regard to individual legumes, a general ban should not be imposed on all legumes. If reactions to other legumes are observed, this must be evaluated on a case-by-case basis and taken into account accordingly [23].

Similarly, a blanket avoidance of nuts is not indicated in the case of a proven peanut allergy [24, 25]. Abstinence should only take place in the case of an individual allergy [25].

The sensitivity of the affected person to peanut can also play a relevant role with regard to an individual

avoidance strategy. Thus, patients whose triggering amount is in the gram range and who react mildly to it have a significantly lower risk of reacting unintentionally to unintentional peanut intakes than patients with a very low reaction threshold—especially if severe reactions already occur at low doses. However, this is rare: Single-dose testing in peanut allergic patients found that less than 5% reacted to 1.5 mg of peanut protein (ED05) and all observed reactions were mild [26]. However, in the case of a generous liberation of foods with a warning label, it must be kept in mind that unintentional entries are not always small amounts (see above) and reaction thresholds may change. On the other hand, it is not justifiable that every peanut allergy sufferer—regardless of their individual risk—should implement the same avoidance recommendations [7].

The more individualized recommendations are formulated, the more attention should also be paid to augmentation factors that may influence the individual reaction threshold depending on the situation. In addition to the known augmentation factors (exercise, use of nonsteroidal anti-inflammatory drugs [NSAID], alcohol, infections, and others [3]), sleep deprivation has recently been described in association with a lowering of the peanut reaction threshold [27].

Do not lose sight of quality of life

In recent years, the quality of life of peanut-allergic children and adolescents and their parents or other caregivers has been increasingly considered. The large European studies APPEAL 1 and 2 showed that the coping and control strategies of affected families are strongly driven by the fear of allergic reactions—with effects on the emotional world, social contacts, relationships and working life [28, 29]. The authors concluded that these effects should to be addressed at an early stage. In addition, improved regulation of allergen labeling, better education of the general population, better information for patients and caregivers, and integration of psychological support are needed, they said.

By involving expert nutritionists and dieticians (www.allergie-wegweiser.de), some of these points can already be effectively implemented. Ultimately, nutritional therapy plays a key role in helping patients and their caregivers learn to make a situation-specific risk assessment, from which an avoidance strategy can be developed to balance safety with maintaining quality of life on an individual basis. In addition, concepts such as the requirement for peanut-free schools, which arise from the fear of reactions, must be transformed into effective coping strategies that promote togetherness [30].

Conclusion

Effective disease management in (peanut) allergy is based on four columns:

- a) A diagnosis, ideally confirmed by provocation, which makes it possible to draw conclusions—at least roughly—about the triggering quantity.
- b) Knowledge about the occurrence of peanut, especially in processed form, including the understanding of the meaning of a warning label.
- c) Situational risk assessment as a basis for individual avoidance strategies that promise the greatest possible safety, but at the same time do not restrict the quality of life more than necessary.
- d) Learning to deal adequately with unforeseen incidents (emergency management) to avoid severe allergic reactions.

Nutritional therapy makes an essential contribution to the establishment of pillars *a* through *c*. Pillar *d* is primarily the task of the pediatrician/allergist, but can be effectively supported by interdisciplinary training measures such as AGATE (“Arbeitsgemeinschaft Anaphylaxie - Training und Edukation”, www.anaphylaxieschulung.de). The need to carry an emergency kit should also always be addressed in the context of nutrition therapy to emphasize the importance of this measure.

Beyond the nutritional therapy work, it is highly recommended that affected persons become members of a patient organization such as the DAAB (“Deutscher Allergie- und Asthmabund”, www.daab.de) in order to receive further everyday assistance in dealing with the disease.

Conflict of interest I. Reese states to have received honoraria from the DAAB—outside the present work. S. Schnadt declares that she has no competing interests.

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