

Food allergy in Asia

Lynette Pei-Chi Shek and Bee Wah Lee

Purpose of review

Food allergy is increasing in prevalence in Western populations, but little is known about it in Asia. The perception is that the prevalence in this region is low, but is likely to increase with the global increase in allergy. Asia is unique because of the many different cultures and eating habits, with the resulting occurrence of unique food allergens. This review describes the epidemiology and clinical features of food allergy, and introduces some of the unusual food allergens in Asia.

Recent findings

Recent studies describing the pattern of anaphylaxis and the role of food triggers show that food is an important cause of severe allergic reactions in Asia. Progress has been made on the characterization of unique food allergens from the region. Peanut and tree nuts are rarely the cause of allergic reactions in Asia. The lack of availability of epinephrine auto-injectors in many countries is an important issue that needs to be addressed.

Summary

The pattern of food allergy in Asia is unique. Unfortunately, data from many parts of Asia are still lacking. Large, well-designed epidemiological studies are needed so that the scale of the problem can be understood, public awareness can be increased and important food allergens in the region can be identified.

Keywords

Asia, Bird's Nest, chestnut, unique food allergens

Introduction

Food allergy is increasing in prevalence in the United States, Europe and Australia, and is recognized as being the most common cause of anaphylaxis in many different countries [1]. Even though most of the world's population lives in Asia, there are very few data on the prevalence and clinical features of food allergy in this region. For many years, it was believed that the prevalence of allergic disease, including food allergy, was low in Asia [2]. Recent studies, however, show increasing trends of allergic disease in the region, with some countries reaching prevalence rates of asthma as high as those seen in developed nations [3,4]. In the West, the asthma pandemic preceded the rise in food allergy. With increasing affluence and urbanization in Asia, many believe that the situation will be similar, with a rise in food allergy following the rise in asthma [5,6]. In time, the prevalence and pattern of food allergy in Asia may become similar to those in the Western world.

There is a paucity of good data on food allergy in Asia. What is especially lacking is the presence of large, well-designed epidemiological studies. Also, very few studies in this region have used food challenges to confirm the diagnosis. There are many reasons for this lack of methodological rigour. This region is home to many populations with vast genetic, cultural, racial, language and socio-economic differences. Dietary differences come in the form of different foods eaten, varied modes of preparation, and varied times of introduction of foods. Another important reason for the lack of studies is that food allergy prevalence is perceived to be low and the clinical presentation mild. Finally, allergy as a medical discipline is still in its infancy in many parts of Asia. This article will review what is known about the epidemiology of food allergy in Asia and describe some of the unique food allergens found in the region.

Epidemiology

Studies of food allergy in Asia consist mainly of questionnaire surveys in individuals with atopic disease. These studies seldom confirm the allergy with measurement of specific IgE or with food challenges. There are few studies that have attempted to study the prevalence in the general population, and these are likely to overestimate the extent of the problem.

Food allergy in the general population

A parent-reported questionnaire of 6404 Singapore children aged 5–12 years estimated the prevalence of

Curr Opin Allergy Clin Immunol 6:197–201. © 2006 Lippincott Williams & Wilkins.

Department of Paediatrics, Yong Loo Lin School of Medicine, National University of Singapore

Correspondence to Dr Lynette Shek, MRCP, Department of Paediatrics, National University of Singapore, 5 Lower Kent Ridge Road, Singapore 119074
Tel: +65 6772 4420; fax: +65 6779 7486; e-mail: paeshekl@nus.edu.sg

Current Opinion in Allergy and Clinical Immunology 2006, 6:197–201

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1528-4050

food allergy to be 4–5% [7]. This was without clinical confirmation of the allergy, however, and the true prevalence is likely to be lower. A Korean study using a self-reported questionnaire among more than 25 000 children aged 6–12 years reported a lifetime prevalence of 10.9% [8]. There was a slightly higher prevalence in the capital Seoul (12.4%) compared with provincial cities (10.1%). In the Sheng-Li oil fields of northeast China, the prevalence of food allergy was estimated to be 4.98% [9]. In Japan, it was estimated to be as high as 12.6% in children under 6 years of age [10]; however, the denominator in this study was not mentioned and there was also no clinical assessment of these individuals.

A methodologically rigorous study with a detailed screening questionnaire and physician assessment would probably give a lower prevalence of food allergy. A cross-sectional study of almost the entire cohort of children in central Israel (more than 9000 children) aged 0–2 years using such rigorous criteria showed that the prevalence of food allergy was in the range 1.2–1.7% [11]. A large population-based study using an extensive and validated questionnaire followed by physician assessment and skin prick test is currently under way in Singapore, Thailand and the Philippines.

Regarding non-IgE-mediated forms of food allergy, there have been anecdotal reports of this in Asia [12]; however, these reports are few and far between, showing that the awareness and understanding of these conditions is still poor.

Food allergy among atopic individuals

A study of 2000 asthmatic children evaluated in a Bangkok hospital reported that food was a trigger for asthma in 7.6% of patients [13]. Again, there was no confirmation with skin tests or food challenge. In children from Hong Kong with asthma, 23% were sensitized to food, with egg and milk being the most common sensitizers [14]. In Taiwanese children with atopic dermatitis, high rates of sensitization were found to shrimp (62.7%), followed by egg white and milk (both 49.2%) and then peanut (35.6%) [15]. A study of the pattern of sensitization in atopic children in Singapore below 5 years of age showed that sensitization to food was high at 46.6% [16].

Food as a trigger for anaphylaxis

Published studies on the epidemiology of all causes of anaphylaxis in Asia are few, although the overall incidence of anaphylaxis appears to be low [17]. In Singapore, we conducted a retrospective study evaluating anaphylaxis in children aged over 5 years who presented to a tertiary hospital. Of 868 children presenting with anaphylaxis, 14.3% of cases were suspected to be due to food [18]. This figure was lower than the 34% found in a review conducted in the United States of 266 children

and adults presenting with anaphylaxis [19]. Interestingly, the most common food allergen was 'Bird's Nest' (see below). In another study of 67 consecutive adults referred to an allergy centre in Singapore, food was the most common trigger for anaphylaxis, being the cause in 44.8% of cases [20]. In this study, shellfish crustaceans and mollusks were responsible for two-thirds of the food-induced reactions. Peanut and Bird's Nest were each the trigger in only one individual.

A retrospective review of all cases of anaphylaxis presenting to the emergency department of a tertiary Hong Kong hospital found food to be a trigger in 49.6% of cases (125 out of 252) [21•]. Seafood accounted for about two-thirds of the reactions. The exact food triggers were not described, and again, no confirmation of the allergy was performed.

Food allergens in Asia

Many food allergens are similar in both Asian and Western communities. While milk and egg allergy seem to be universal to all countries [13], the profile of other food allergens appears to vary greatly. In the population study of Japanese children under 6 years of age [10], egg, milk and seafood were the most common food triggers for immediate-type allergic reactions, as assessed by history. Using a questionnaire survey in Korean children with atopic eczema [22•], it was found that the most common food allergens were egg, milk, fish and seafood in 6–12-year-old children, and seafood, peach, milk, egg and fish in 12–15-year-old children. Hong Kong children with asthma were most commonly sensitized to cow's milk (20%), egg (15%), peanut (9%), wheat (6%) and soy (4%) [23]. In this study, sensitization to any food was found to be a risk factor for asthma, but clinically relevant food allergy was thought to be rare, as only four of 231 children had food-specific IgE levels that were suggestive of clinical reactivity. Among young Israeli children with histories highly suggestive of food allergy, cow's milk, egg and sesame were the major food allergens to which they were sensitized, with sesame allergy being found in 0.2% of the cohort [11].

A point of interest seen in all the studies from Asia is that peanuts and tree nuts were not found to be a common cause of anaphylaxis. This is in stark contrast to the high rates of peanut allergy seen in Western societies such as the United States [24] and United Kingdom [25]. As a cause of anaphylaxis, peanut and tree nuts account for most emergency department visits in parts of the United States [26], Europe [27] and Australia [28]. Lack of exposure to peanut is unlikely to be a cause, as many studies, including those cited above, have shown the presence of peanut sensitization from an early age. The difference could be due to different methods of preparation [29], early consumption,

differences in maternal diet [30] and other as yet unidentified genetic and environmental factors.

Unique food allergens in Asia

There are, however, some unique and unusual food allergens which are not found in other countries or were first described in Asian populations. These food allergens will be described here.

Bird's nest

'Bird's nest' is a Chinese delicacy made from the saliva of the swiftlet, *Collocalia* spp., which is used to form the nest of this bird. It was the most common cause of food-induced anaphylaxis among Singapore children (27%), followed by egg and milk (11% combined) [18]. We have documented that the reaction is IgE-mediated and that the major allergen is a 66 kDa glycoprotein [31]. Allergy to bird's nest has not been described previously, and this shows the importance of cultural practices in the development of disease. Interestingly, among adults in Singapore presenting with food-induced anaphylaxis, only one case out of 44 was due to bird's nest, suggesting that this form of food allergy may be outgrown [20].

Buckwheat

Buckwheat allergy has been described in China, Japan and Korea [32,33]. Buckwheat is used to make noodles, cakes and biscuits, and is consumed in large quantities, particularly in Japan, where it is used to make Soba noodles. Buckwheat was ranked fourth as a cause of immediate-type food allergy in Japan [34]. The major allergens have been studied, and levels of serum specific IgE that predict clinical reactivity to buckwheat with high sensitivity and specificity have also been identified [35].

Chestnut

Chestnut is frequently consumed in Korea, and represented the third most common food allergen as diagnosed by skin prick testing among adults and children in Korea [36]. It was also the most common tree nut allergen in this population. Chestnuts have been implicated in the latex-fruit syndrome, and possess cross-reactive allergens with avocado, peach, apple and mugwort pollen [37]. At least nine major allergens of chestnut have been identified [38].

Chickpea

The chickpea is a member of the legume family, and anaphylaxis to chickpeas has been described [39]. Chickpea is a staple food in India and is introduced into the child's diet at an early age. Of individuals attending allergy clinics in Mumbai, India, 1% reported food allergy, and 22% (31 of 142) of these had true chickpea allergy, as confirmed by double-blind, placebo-controlled food allergy testing [40].

Royal jelly

Royal jelly is consumed as a health tonic in Asia, with claims that it has healing and rejuvenative properties to counter anxiety, fatigue, insomnia and other chronic illnesses such as asthma. It is produced by worker bees as food for their larvae. Reports of asthma exacerbations and anaphylaxis to royal jelly have come from Hong Kong [41] and Australia [42].

Sesame

Sesame is a major food allergen in Israel. Among children under 2 years of age with histories and skin tests suggestive of food allergy, sesame was the third most common allergen behind egg and cow's milk [11]. In fact, as a cause of anaphylaxis, it was second only to cow's milk. Sesame is introduced early into the diet of children in Israel, and this could be a factor for its role as a food allergen in this population.

Management

Accurate diagnosis is crucial to the proper management of a child with food allergy. Unfortunately, although the true prevalence of food allergy in Asia is likely to be low, traditional and cultural beliefs blame foods for a variety of reactions, with the resultant practice of avoiding suspect foods. For example, in India, children with respiratory allergies are told to restrict their diets [43]. There is, therefore, a need to increase awareness of proper diagnosis of food allergy among both medical practitioners and the public.

Labeling of food

The labeling of packaged foods manufactured in Asia is another area that needs to be improved. In Singapore, the food control department of the Ministry of Health requires that a complete list of ingredients used in packaged food should be stated on the label. There is legislation in Europe and the United States mandating the comprehensive labeling of the most common food allergens in packaged foods [44]; however, no such legislation exists in most Asian countries. There is also the danger of eating out in Asian restaurants, as Asian cooking involves using many spices, nuts and flavourings to season the food. This may result in a food-allergic individual inadvertently consuming hidden trace amounts of the offending food when eating out. With the likelihood of an increase in the prevalence of food allergy, there is a pressing need to improve awareness of food allergy, especially among people in the food industry. For school-children, it is crucial that parents and teachers be aware of the importance of avoiding even small amounts of the food allergen.

Availability of epinephrine auto-injectors

Epinephrine is life-saving in anaphylactic reactions. Carrying an epinephrine auto-injector is recommended

for children who have had a previous severe reaction to food or who are allergic to the foods that can cause a severe reaction when taken in trace amounts (for example, peanuts and tree nuts). Unfortunately, such auto-injectors are not available in many Asian countries and are costly [45^{••}]. This is an area of significant concern and needs to be addressed by health authorities, medical professionals, national allergy societies and patient advocacy groups.

Conclusion

There are some data on the epidemiology and clinical characteristics of food allergy in Asia, and some of the food allergens unique to this region have been characterized. Much work still needs to be done, however. First, large-scale, methodologically sound epidemiological studies need to be performed. This should be done in different countries, as food allergens are likely to be unique to different communities. This will aid physicians in giving advice about appropriate food avoidance, and so that food labeling laws may be relevant to each country. Secondly, awareness of food allergy needs to be improved. Finally, epinephrine auto-injectors need to be made available and affordable to the food-allergic individual in Asia.

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