UPDATE ON SOLID FOOD INTRODUCTION IN HONG KONG INFANTS

Agnes SY Leung[1,2], JS Rosa Duque[3], Gilbert T Chua[3], PK Ho[4], Ivan CS Lam[5], Ting F Leung[1,2] , on behalf of Hong Kong Society for Paediatric Immunology Allergy and Infectious Diseases

[1]Department of Paediatrics, Prince of Wales Hospital, The Chinese University of Hong Kong, Hong Kong

[2]Hong Kong Hub of Paediatric Excellence, The Chinese University of Hong Kong, Hong Kong

[3]Department of Paediatrics and Adolescent Medicine, Queen Mary Hospital, The University of Hong Kong, Hong Kong

[4]Department of Paediatrics, Queen Elizabeth Hospital, Hong Kong

[5]Department of Paediatrics and Adolescent Medicine, Princess Margaret Hospital, Hong Kong

COMPETING INTERESTS: The authors declare that they have no competing interests.

Background

- The estimated local prevalence of adverse food reactions in young children ranged from 4 to 8%.[1,2]
- The most common food-allergic symptoms are urticaria/angioedema (~35-40%), delayed rash (~20-25%), gastrointestinal complaints (~20%), anaphylaxis (~15%) and respiratory symptoms (~2%).[3]
- Seafoods are the most common local food-allergic trigger, followed by hen's egg, cow's milk and nuts.[1,2]
- The management for adverse food reactions depends on the underlying etiology, such as IgE-mediated food allergy, eczema exacerbation, lactose intolerance, food-protein induced enterocolitis syndrome or celiac disease, etc.[4]

- For IgE-mediated food allergies, the mainstay approach is strict avoidance of the specific food triggers and use of an adrenaline autoinjector administered at the vastus lateralis muscle during severe reactions after accidental ingestion.[4]
- Despite comprehensive and reinforced education, the incidence of anaphylaxis in Hong Kong steadily increased in the past decade[5] while mortality due to anaphylaxis in the Western world remained at 100-200 patients annually[6].
- Recent advances in diagnosis of food allergy include:
    - Compelling evidence argues against measurement of food-specific IgG and IgA as part of the diagnostic workup for any adverse food reactions, and therefore this practice is strongly discouraged.[7]
    - On the other hand, the innovative component-resolved diagnosis (CRD) is gaining wider utilization, which has been helpful for identifying specific, causative allergens that patients need to avoid, such as the omega-5-gliadin in wheat for food-dependent, exercise-induced anaphylaxis,[8,9] as well as the identification of cross-sensitization between different allergens, e.g. Ara h 8 and Bet v 1.[10]
- Research on dietary advancement therapy, including oral immunotherapy[11] and food ladders[12] are active and promising. Recent studies on peanut oral immunotherapy have shown that it is safe and effective in preschoolers[13-15], and especially among infants[16].
- Preventative measures include early introduction of certain allergenic foods, such as egg and peanut, to high-risk populations, are gaining traction as means to reduce the development of IgE-mediated food allergies.[17,18]

This document will update practitioners on these novel approaches to food allergies and their relevance to this locality:

- The Learning Early About Peanut Allergy (LEAP) study yielded revolutionary findings that led to a paradigm shift in the field of allergy.[17]
- For patients who were at a high risk for developing peanut allergy (PA), mainly infants with moderate to severe atopic dermatitis or egg allergy or both, consumption of 6 grams of peanut protein per week (approximately 4.5 teaspoons of smooth peanut

butter) was associated with 86.1% relative reduction in the development of PA at 5 years old.[16]

- Based on these results, many international guidelines changed their recommendations on the approach to peanut introduction for high-risk children and published a new algorithm to direct management steps according to risk factors.[19,20]
- There is no protective benefit from the use of hydrolysed formula in the first year of life against food allergy or food sensitization.
- Maternal exclusion of common allergens during pregnancy and/or lactation as a means to prevent food allergy is not recommended.

The key points in accordance with recommendations from regional[18] and international organisations[19,20]are summarized as follows:

- For healthy infants: no change in current feeding guideline is recommended
  - Introduce complementary foods at around 6 months of age, but not before 4 months old with age-appropriate non-choking form;
  - Breastfeeding to continue alongside complementary food introduction until 2 year old or longer[21];
  - There is no evidence to clearly support the younger sibling of a peanut-allergic child is at increased risk of developing peanut allergy, though such infants may be at risk of developing peanut allergy secondary to delayed introduction of peanut.
- For at-risk infants (i.e., healthy infants with a family history of atopy or infants with non-severe eczema)
  - No delay in introduction of allergenic foods including egg, cow's milk, peanut, soy, wheat, fish and shellfish;
  - These allergenic foods should be introduced in a sensible manner once weaning has commenced.
- For high-risk infants with severe eczema
  - Introduction of all allergenic foods should not be delayed;
  - Eczema should be aggressively controlled with use of topical corticosteroid to proactively achieve eczema remission and prevent eczema flare;

- Screening before introduction by skin prick testing or specific IgE is not recommended.
- In case of families' strong preference, e.g., significant anxiety, allergy testing such as skin prick or specific IgE test may be considered if resources allowed. Nevertheless, a positive skin prick testing or specific IgE result only indicate sensitization but not a confirmation of the diagnosis of food allergy. False positive results are common in patients with severe eczema.
- Infants with a positive skin reaction or sIgE without a clinical history of reaction should be offered timely supervised oral food challenges as early as 4 months but ideally not later than 10 months of age, preferably to be performed in the office of a doctor trained in recognition and management of allergic reactions.
- Infants who had a negative skin prick testing, specific IgE or oral food challenge must be advised to incorporate the food into their diet regularly as soon as possible.
- Infants who were confirmed to have food allergy should be advised strict avoidance and to be referred to an allergist for the consideration of early food immunotherapy.

References:

1. Ho MH, Lee SL, Wong WH, Ip P, Lau YL. Prevalence of self-reported food allergy in Hong Kong children and teens--a population survey. *Asian Pac J Allergy Immunol*. Dec 2012;30(4):275-84.
2. Leung TF, Yung E, Wong YS, Lam CW, Wong GW. Parent-reported adverse food reactions in Hong Kong Chinese pre-schoolers: epidemiology, clinical spectrum and risk factors. *Pediatr Allergy Immunol*. Jun 2009;20(4):339-46. doi:10.1111/j.1399-3038.2008.00801.x
3. Chu DK, Wood RA, French S, et al. Oral immunotherapy for peanut allergy (PACE): a systematic review and meta-analysis of efficacy and safety. *Lancet*. Jun 1 2019;393(10187):2222-2232. doi:10.1016/s0140-6736(19)30420-9
4. Sampson HA, Aceves S, Bock SA, et al. Food allergy: a practice parameter update-2014. *J Allergy Clin Immunol*. Nov 2014;134(5):1016-25.e43. doi:10.1016/j.jaci.2014.05.013
5. Leung ASY, Li RMY, Au AWS, et al. Changing pattern of pediatric anaphylaxis in Hong Kong, 2010-2019. *Pediatr Allergy Immunol*. Jan 2022;33(1):e13685. doi:10.1111/pai.13685
6. Bock SA, Muñoz-Furlong A, Sampson HA. Fatalities due to anaphylactic reactions to foods. *J Allergy Clin Immunol*. Jan 2001;107(1):191-3. doi:10.1067/mai.2001.112031
7. Lee TH, Wu YY, Chan JK, Ho HK, Li PH, Rosa Duque JS. Immunoglobulin G testing in the diagnosis of food allergy and intolerance. *Hong Kong Med J*. Aug 2017;23(4):419-20. doi:10.12809/hkmj176310
8. Koike Y, Yanagida N, Sato S, et al. Predictors of Persistent Wheat Allergy in Children: A Retrospective Cohort Study. *Int Arch Allergy Immunol*. 2018;176(3-4):249-254. doi:10.1159/000489337
9. Chinthrajah RS, Tupa D, Prince BT, et al. Diagnosis of Food Allergy. *Pediatr Clin North Am*. Dec 2015;62(6):1393-408. doi:10.1016/j.pcl.2015.07.009
10. Mittag D, Akkerdaas J, Ballmer-Weber BK, et al. Ara h 8, a Bet v 1-homologous allergen from peanut, is a major allergen in patients with combined birch pollen and peanut allergy. *J Allergy Clin Immunol*. Dec 2004;114(6):1410-7. doi:10.1016/j.jaci.2004.09.014
11. Wasserman RL, Factor J, Windom HH, et al. An Approach to the Office-Based Practice of Food Oral Immunotherapy. *J Allergy Clin Immunol Pract*. May 2021;9(5):1826-1838.e8. doi:10.1016/j.jaip.2021.02.046
12. Chomyn A, Chan ES, Yeung J, et al. Canadian food ladders for dietary advancement in children with IgE-mediated allergy to milk and/or egg. *Allergy Asthma Clin Immunol*. Aug 5 2021;17(1):83. doi:10.1186/s13223-021-00583-w
13. Soller L, Abrams EM, Carr S, et al. First Real-World Safety Analysis of Preschool Peanut Oral Immunotherapy. *J Allergy Clin Immunol Pract*. Nov-Dec 2019;7(8):2759-2767.e5. doi:10.1016/j.jaip.2019.04.010
14. Jones SM, Kim EH, Nadeau KC, et al. Efficacy and safety of oral immunotherapy in children aged 1-3 years with peanut allergy (the Immune Tolerance Network IMPACT trial): a randomised placebo-controlled study. *Lancet*. Jan 22 2022;399(10322):359-371. doi:10.1016/s0140-6736(21)02390-4
15. Vickery BP, Berglund JP, Burk CM, et al. Early oral immunotherapy in peanut-allergic preschool children is safe and highly effective. *J Allergy Clin Immunol*. Jan 2017;139(1):173-181.e8. doi:10.1016/j.jaci.2016.05.027

16. Soller L, Carr S, Kapur S, et al. Real-world peanut OIT in infants may be safer than non-infant preschool OIT and equally effective. *J Allergy Clin Immunol Pract*. Dec 23 2021;doi:10.1016/j.jaip.2021.12.009
17. Du Toit G, Roberts G, Sayre PH, et al. Randomized trial of peanut consumption in infants at risk for peanut allergy. *N Engl J Med*. Feb 26 2015;372(9):803-13. doi:10.1056/NEJMoa1414850
18. Tham EH, Shek LP, Van Bever HP, et al. Early introduction of allergenic foods for the prevention of food allergy from an Asian perspective-An Asia Pacific Association of Pediatric Allergy, Respirology & Immunology (APAPARI) consensus statement. *Pediatr Allergy Immunol*. Feb 2018;29(1):18-27. doi:10.1111/pai.12820
19. Halken S, Muraro A, de Silva D, et al. EAACI guideline: Preventing the development of food allergy in infants and young children (2020 update). *Pediatr Allergy Immunol*. Jul 2021;32(5):843-858. doi:10.1111/pai.13496
20. Fleischer DM, Chan ES, Venter C, et al. A Consensus Approach to the Primary Prevention of Food Allergy Through Nutrition: Guidance from the American Academy of Allergy, Asthma, and Immunology; American College of Allergy, Asthma, and Immunology; and the Canadian Society for Allergy and Clinical Immunology. *J Allergy Clin Immunol Pract*. Jan 2021;9(1):22-43.e4. doi:10.1016/j.jaip.2020.11.002
21. World Health Organization. Chronic Respiratory D, Arthritis T, Allergy WWMotPo, Allergic A. Prevention of allergy and allergic asthma. Geneva: World Health Organization; 2003.