Winnipeg Regional Health Authority / Office régional de la santé de Winnipeg
Caring for Health / À l'écoute de notre santé

Title: Introduction of Highly Allergenic Foods

PRACTICE ISSUE EVIDENCE SUMMARY

Best Practice Issue: Timing of introduction of highly allergenic foods to infants including those at high risk of developing food allergy.	
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Date of Final Approval: March 31, 2010	To be Reviewed: March 2013

Purpose: (goals, scope, intended users, settings, and patient/client groups)

The purpose of this evidence review is to provide guidance to health care providers when providing recommendations on introduction of highly allergic foods to infants at low or high risk of developing food allergies.

The goals are to develop consistent guidelines for introduction of complementary foods. Intended users are health care providers within the WRHA in community and acute care settings.

This document does not refer to a child who has developed an atopic disease that may be precipitated or exacerbated by ingested proteins.

Definitions:

Allergy: A hypersensitivity reaction initiated by immunologic mechanisms.[1]
Atopic Disease: Clinical disease characterized by allergy; typically refers to atopic dermatitis, asthma, allergic rhinitis, and food allergy.[1]
Atopy: Production of immunoglogulin E (IgE) antibodies in response to allergens confirmed by skin testing.[1]
Complementary Foods: Solid foods and liquids other than breastmilk or infant formula.
Food Allergy: An immunologically mediated hypersensitivity reaction to any food, including IgE-mediated and/or non-IgE mediated allergic reactions.
Highly allergic foods: Although there is no general agreement about the relative allergenicity of foods, in Canada, the nine priority allergens include: milk; egg; peanut; tree nuts; seafood (includes fish and shellfish); soy; wheat; sesame seed; sulphites[2].
Infant at high risk of developing allergy: Infant with at least 1 first-degree relative (parent or sibling) with documented allergic disease.[1] The risk of allergy in an infant with one allergic parent is about 38-58% and as high as 60-80% in a child born to two parents with allergy.
Infants at low risk of developing allergy: Infants without parental/sibling history of allergy. An infant without family history of allergy has about a 15% chance of developing allergy.
Tolerance: Recognition by the immune system that the food components are "foreign but safe". The immune system does not respond, there is no adverse effect and no signs of allergy.
Allergic sensitization: Priming of the immune system to respond to an allergen.

Evidence Review: (Please list type of evidence reviewed or clinical practice guidelines or process for literature search, as applicable.)

Traditionally the recommendations for introduction of complementary foods to infants at increased risk of atopy based on family history were to delay the introduction of various highly allergenic foods any where from one year to three years. For example, prior to 2008 the American Academy of Pediatrics recommended introduction of dairy products at one year, eggs at two years and peanuts, tree nuts and fish at 3 years of age. Inconsistent recommendations have become common practice for all infants whether at high risk or low risk for developing allergy. These recommendations have tended to be based on expert opinion. Currently, The Canadian Pediatric Society (CPS) recommends if there is a family history of allergies to wait until 3 years to introduce peanuts, tree nuts and shell fish (reviewed 2006)[3].

More recent thinking indicates a change in position, as reviews of recent literature acknowledge that we do not know

whether certain kind of avoidance prevents development of allergies. Recommendations about avoidance of specific food allergens have been withdrawn and replaced by comments about the lack of current evidence on these topics.

Practice-Based Evidence in Nutrition (PEN)[4], [5]has recently (February 2009) reviewed the current evidence on this topic. The summary for high risk infants is noted below, followed by the summary for low risk infants[6].

For High Risk Infants:

Practice Guidance Summary:

Delaying the introduction of complementary foods after six months of age, as a single preventative strategy, does not appear to decrease infant and childhood risk for atopic diseases. No controlled studies have been conducted addressing the primary allergy prevention effect of delaying the common food allergens including eggs, fish, shellfish, peanuts, soy and wheat as a single intervention. However some observational studies have not observed a benefit on decreased risk of allergic disease when the introduction of eggs and grains have been delayed. An ongoing clinical trial is examining the effect of early, repeated consumption of peanuts on decreasing the risk of allergic sensitization in high risk infants compared to peanut avoidance. The American Academy of Pediatrics (AAP), Committee on Nutrition and Section on Allergy and Immunology (2008) and the European Society for Pediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) Committee on Nutrition (2008) found no convincing evidence that delaying the introduction of potentially allergic foods (fish, eggs and peanut protein) beyond six months of age has a protective effect on the development of atopic disease. (**C** - The preceding conclusions are supported by limited evidence or expert opinion)

Key Practice Point

Observational studies do not provide convincing evidence to suggest that delaying the introduction of highly allergic foods (including eggs, fish, milk, wheat and peanut products) has a protective effect on the development of atopic disease in children with a family history of allergy. Controlled trials are required to examine the timing of introduction of these foods and the development of atopic disease.

Evidence:

a. A 2008 clinical report from the American Academy of Pediatrics (AAP) examining factors in pregnancy and lactation that influence the development of atopic disease (atopic dermatitis, asthma or food allergy) in early life indicates that although solid foods should not be introduced before four to six months of age, there is no convincing evidence that delaying the introduction of highly allergic foods (fish, eggs and peanut protein) has a protective effect on the development of atopic disease (1). In support of this statement, the report cites the prospective study by Zutvaren, et al. (2) in which atopy was confirmed by skin testing and the history of introduction of solid foods was carefully recorded. In this cohort, the later introduction of solids had no effect on the prevalence of asthma or atopic dermatitis and there was an increased risk of atopic dermatitis associated with later compared to early introduction of eggs and milk (later introduction is classified as milk products after six months and eggs after eight months) (2). The AAP comments that additional studies are needed to examine the timing of the introduction of solid foods that are thought to be highly allergic (i.e. cow milk, fish, eggs and peanut-containing foods) and the development of atopic disease (1).

b. A 2008 position paper from European Society for Pediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) Committee on Nutrition regarding complementary feeding found no convincing evidence that avoiding or delaying the introduction of potentially allergic foods (i.e. fish, eggs) beyond six months reduces allergies in infants with a family history of allergy (3). The position paper indicates that available data summarized from observational studies in infants at increased risk for allergy regarding the introduction of specific complementary foods is of limited quality and provides contrasting conclusions (4,5). The position paper comments that although avoiding foods such as nuts and shellfish is not likely to cause harm, evidence is cited to indicate that avoiding fish could lead to a reduction in omega-3 fatty acid intake and have potentially negative consequences on cognitive outcome or immune function (5). Furthermore, the position paper cites observational studies which have suggested that delaying the introduction of certain foods (including eggs) did not decrease and might actually increase the risk of allergic sensitization (6-8).

Comments

The Australian Society of Clinical Immunology and Allergy position statement: summary of allergy prevention in children

(2005) suggests there is no evidence that delay of specific foods beyond four to six months of age has a protective effect but that this requires additional research (5).

Health Canada recommends infants should be introduced to nutrient-rich, complementary foods with particular attention to iron at six months (9).

An ongoing RCT (Learning Early About Peanut Allergy (LEAP) study) is examining the best strategy to prevent peanut allergy in infants (four to 10 months of age) with a pre-existing allergic condition (atopic dermatitis or egg allergy) by comparing the effects of early, repeated consumption of peanuts (6 grams of peanut protein/week) to peanut avoidance in children until three years of age (10). All children will receive allergy testing and blood samples collected to examine differences in immune system development

References

1. Greer FR, Sicherer SH, Burks AW; American Academy of Pediatrics Committee on Nutrition; American Academy of Pediatrics Section on Allergy and Immunology. Effects of early nutritional interventions on the development of atopic disease in infants and children: the role of maternal dietary restriction, breastfeeding, timing of introduction of complementary foods, and hydrolyzed formulas. Pediatrics. 2008 Jan [cited 2008 27 Feb]; 121(1):183-91. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/18166574

2. Zutavern A, von Mutius E, Harris J, Mills P, Moffat, S, White C, et al. The introduction of solids in relation to asthma and eczema. Arch Dis Child. 2004 Apr [cited 2008 14 Apr];89(4):303-8. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/15033835

3. Agostoni C, Decsi T, Fewtrell M, Goulet O, Kolacek S, Koletzko B, et al.; ESPGHAN Committee on Nutrition. Complementary feeding: a commentary by the ESPGHAN Committee on Nutrition. J Pediatr Gastroenterol Nutr. 2008 Jan [cited 2008 27 Feb];46(1):99-110. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/18162844

4. Høst A, Koletzko B, Dreborg S, Muraro A, Wahn U, Aggett P, et al. The joint statement of the European Society for Paediatric Allergology and Clinical Immunology (ESPACI) Committee on Hypoallergenic Formulas and the European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) Committee on Nutrition. Dietary products used in infants for treatment and prevention of food allergy. Arch Dis Child. 1999 Jul [cited 2008 26 Mar];81(1):80-84. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/10373144

5. Prescott SL, Tang MLK; Australasian Society of Clinical Immunology and Allergy.The Australasian Society of Clinical Immunology and Allergy position statement: summary of allergy prevention in children. Med J Aust. 2005 May 2 [2008 15 Apr];182(9):464-7. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/15865590

6. Zutavern A, von Mutius E, Harris J, Mills P, Moffat, S, White C, et al. The introduction of solids in relation to asthma and eczema. Arch Dis Child. 2004 Apr [cited 2008 14 Apr];89(4):303-8. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/15033835

7. Zutavern A, Brockow I, Schaaf B, Bolte G, von Berg A, Diez U, et al. Timing of solid food introduction in relation to atopic dermatitis and atopic sensitization: results from a prospective birth cohort study. Pediatrics. 2006 Feb [cited 2008 14 Apr];117(2):401-11. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/16452359

8. Filipiak B, Zutavern A, Koletzko S, von Berg A, Brockow I, Grübl A, et al; GINI-Group. Solid food introduction in relation to eczema: results from a four-year prospective birth cohort study. J Pediatr. 2007 Oct [cited 2008 3 Mar];151(4):352-8. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/17889067

9. Health Canada. Exclusive breastfeeding duration; 2004 Health Canada recommendation. Ottawa (ON): Health Canada; 2004 [cited 2006 28 Feb] Available from: http://www.hc-sc.gc.ca/fn-an/nutrition/child-enfant/infant-nourisson/excl_bf_dur-dur_am_excl_e.html

10. Paediatric Allergy Research Dept., Evelina Children's Hospital, St. Thomas' Hospital : London, UK. Learning Early about Peanut Allergy (LEAP) study; 2008 [cited 2008 14 May]. Available from: http://www.leapstudy.co.uk/LEAP.html

For Low Risk Infants

Practice Guidance Summary:
No general recommendations can be made for when to introduce common allergenic foods to infants six months or older without parental history of allergy:
Although Health Canada states traditionally egg white has been delayed until one year of age, there is no evidence to support this practice for the prevention of allergy. There is no evidence to support the delayed introduction of other common allergenic foods (such as fish, eggs and foods containing peanut protein).

Key Practice Point:

For infants older than four months of age without parental history of allergy, there is a lack of consistent evidence to suggest that delaying the introduction of highly allergic solid foods (including fish, eggs and foods containing peanut protein) has an impact on the development of atopic disease. Additional studies are required that examine the timing of introduction of solid foods and the development of allergies in infants without parental history of allergy. (D)

Evidence

a. Among infants without parental history of allergy, no studies have been found that were conducted to determine the benefit from delaying the introduction of common allergenic foods; peanut, tree nuts, egg, wheat and seafood beyond four months of life (1).

b. The 1998 document, Nutrition for Healthy Term Infants, from the Canadian Paediatric Society, Dietitians of Canada and Health Canada indicates that traditionally, egg white is not given to infants until one year of age to reduce risk for an allergic reaction (2).

c. A 2008 clinical report from the American Academy of Pediatrics (AAP) examining factors in pregnancy and lactation that influence the development of atopic disease (atopic dermatitis, asthma or food allergy) in early life indicates that although solid foods should not be introduced before four to six months of age, there is no convincing evidence that delaying the introduction of highly allergic foods (fish, eggs and peanut protein) has a protective effect on the development of atopic disease (3). In support of this statement, the report cites a U.S. birth cohort study (Diabetes Autoimmunity Study in the Young (DAISY)) that followed 1,612 children followed over five years (89% follow up) to examine the incidence of wheat allergy (4). Questionnaire data and dietary exposure information were collected at three, six, nine, 15, 24 months and then on an annual basis. Sixteen children (1%) had a reported wheat allergy at five years of age (excluding celiac disease and autoimmunity). After adjusting for breastfeeding duration, introduction of rice cereal, family history of allergy, and history of food allergy before six months of age, initial exposure to cereal grains (wheat, barley, rye, oats) after six months compared to before six months increased the risk of wheat allergy (≥7 months adjusted OR, 3.8; 95% CI, 1.18-12.28) (4). The AAP comments that additional studies are needed to examine the timing of the introduction of solid foods that are thought to be highly allergic (i.e. cow's milk, fish, eggs and peanut-containing foods) and the development of atopic disease (3).

d. A 2008 position paper from European Society for Pediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) Committee on Nutrition regarding complementary feeding (i.e. solid foods and liquids other than breastmilk or infant formula) found no convincing evidence that avoiding or delaying the introduction of potentially allergic foods (i.e. fish, eggs) beyond six months reduces allergies in infants without a family history of allergy (5). The paper identifies only one cohort study in infants without a family history of allergy, which found that delayed exposure to cereal grains (after six months) increased the risk of wheat allergy (4). Furthermore, the position paper cites evidence that avoiding foods such as fish can decrease omega-3 fatty acid intake and result in negative nutritional consequences on cognitive and immune function (5).

References

1. Sicherer SH, Munoz-Furlong A, Murphy R, Wood RA, Sampson HA. Proceedings of a symposium on pediatric food allergy April 20, 2002. Pediatrics. 2003 Jun [cited 2008 20 May];111(6 Pt 3):1591-4. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/12777597

2. Canadian Paediatric Society, Dietitians of Canada, and Health Canada. Nutrition for healthy term infants. Ottawa: Minister of Public Works and Government Services; 2005.. [cited 2008 20 May]. Available from: http://www.hc-sc.gc.ca/fn-an/pubs/infant-nourrisson/nut_infant_nourrisson_term_e.html

3. Greer FR, Sicherer SH, Burks AW; American Academy of Pediatrics Committee on Nutrition; American Academy of Pediatrics Section on Allergy and Immunology. Effects of early nutritional interventions on the development of atopic disease in infants and children: the role of maternal dietary restriction, breastfeeding, timing of introduction of complementary foods, and hydrolyzed formulas. Pediatrics. 2008 Jan [cited 2008 27 Feb];121(1):183-91. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/18166574

4. Poole JA, Barriga K, Leung DY, Hoffman M, Eisenbarth GS, Rewers M, et al. Timing of initial exposure to cereal grains and the risk of wheat allergy. Pediatrics. 2006 Jun [cited 2008 14 May];117(6):2175-82. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/16740862

5. Agostoni C, Decsi T, Fewtrell M, Goulet O, Kolacek S, Koletzko B, et al.; ESPGHAN Committee on Nutrition. Complementary feeding: a commentary by the ESPGHAN Committee on Nutrition. J Pediatr Gastroenterol Nutr. 2008 Jan [cited 2008 27 Feb];46(1):99-110. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/18162844

Recommendations for care /service including important care/service processes: (exclusions and exceptions, criteria or threshold for evaluation, method for documentation)

- After 6 months of age, there is no evidence proving that delaying foods will prevent allergy development.
- Exclusive breastfeeding with Vitamin D supplementation is recommended for the first six months of life for healthy term infants, as breast milk is the best food for optimum growth. Infants should be introduced to nutrient-rich, solid foods with particular attention to iron at six months. There is no nutritional benefit to introducing solid foods before 6 months of age.
- The introduction of one food at a time makes it easier to identify the cause of an allergic reaction, were it to occur. There is no evidence to indicate the ideal interval before the introduction of the next new food; a general guideline is between two to three days. Single new foods should be introduced repeatedly over the two to three day interval. . Mixed foods should not be given until each food component has been eaten on its own and baby has not demonstrated signs of allergy
- Health Canada recommends whole pasteurized cow's milk not be introduced until 9-12 months of age and should not replace breastfeeding or iron fortified infant formula unless adequate sources of iron and vitamin C are provided from food sources.
- Peanut butter or other nut butters should be delayed to closer to one year due to choking concerns. All nuts should not be given to children until 4 years of age (unless they are ground nuts) due to choking concerns.
- Honey should not be fed to infants less than 12 months of age due to a danger of botulism.

Practice Changes:

Consistent guidelines as above.

Anticipated Impact:

Health care providers will provide consistent recommendations regarding the introduction of highly allergenic foods to infants at high or low risk of developing food allergies.

Instructions for implementing the guide: Education of health care providers.	
These recommendations have been reviewed by a number of people, feedback has been received from:	
Pat Ozechowsky, RD, CNSD	Pediatric Clinical Dietitian, HSC
Nestor Cisneros MD FRCPC	Assistant Professor Section of Allergy and Clinical Immunology
WRHA Community Nutritionist Practice Council	Approved September, 2009
Child Health Working Group	Approved December, 2009
Dr Lynne Warda, MD FRCPC	Associate Professor, Department of Pediatrics and Child Health Injury Prevention and Child Health
WRHA Nutrition Advisory Committee	Approved March 31, 2010

[1] Greer FR, Sicherer SH, Burks AW; American Academy of Pediatrics Committee on Nutrition; American Academy of Pediatrics Section on Allergy and Immunology. Effects of early nutritional interventions on the development of atopic disease in infants and children: the role of maternal dietary restriction, breastfeeding, timing of introduction of complementary foods, and hydrolyzed formulas. Pediatrics. 2008 Jan [cited 2008 27 Feb];121(1):183-91. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/18166574

[2] Canadian Food Inspection Agency: Food Allergens. Accessed at http://www.inspection.gc.ca/english/fssa/labeti/allerg/allerge.shtml

[3] Feeding your baby in the first year, **Reviewed by the CPS Nutrition Committee and Public Education Subcommittee. Updated: December 2006** Accessed http://www.caringforkids.cps.ca/pregnancy&babies/Feeding.htm 28/5/2009.

[4] Practice-Based Evidence in Nutrition, Food Allergies – High Risk Infant Practice Guidance Summary, Last updated February 27, 2009. Accessed at www.dieteticsatwork.com/pen, 3/4/2009.

[5] Practice-Based Evidence in Nutrition, Food Allergies – High Risk Infant: Key Practice Points: Evidence/References, Last updated February 27, 2009. Accessed at www.dieteticsatwork.com/pen, 3/4/2009

[6] Practice Based Evidence in Nutrition, Infant Nutrition – Introduction of Complementary Foods: Key Practice Points: Evidence and Reference accessed 3/24/2009 at www.dieteticsatwork.com/pen .