treatment with intramuscular progesterone during pregnancy were not associated with significant differences in the frequency of childhood PN/TN/SS sensitization versus sensitization to other foods. Maternal ingestion of eggs, dairy, or seafood did not increase the odds of PN/TN/SS sensitization in the child; however, ingestion of TN and SS during the first trimester of pregnancy was associated with increased odds of PN/TN/SS sensitization. Maternal PN ingestion during pregnancy was associated with increased odds of PN/TN/SS sensitization in the child.

CONCLUSIONS. There was no increase in the prevalence of PN/TN/SS sensitization in children born to parents with a history of infertility or conception with medical assistance with or without progesterone. Maternal ingestion of TN/SS during pregnancy was associated with increased odds of PN/TN/SS sensitization in the child.

REVIEWER COMMENTS. The effect of prenatal exposure and possible alterations to the prenatal milieu, such as substances used in fertility treatments, are important questions in addressing the possible causes of the increasing prevalence of food allergy. Limitations of this study include its retrospective nature, possible dietary recall bias, and limited information on the composition of the oil for the progesterone treatments.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2014-1817K

Jessica Stern, MD
Theresa Bingemann, MD
Rochester, NY

Role of Maternal Elimination Diets and Human Milk IgA in the Development of Cow’s Milk Allergy in the Infants

PURPOSE OF THE STUDY. The goal of this study was to evaluate the association of maternal cow’s milk (CM) avoidance during breastfeeding with specific IgA levels in human milk and the development of CM allergy in infants.

STUDY POPULATION. This prospective birth cohort study evaluated 145 mother–infant pairs who were recruited at birth and followed up prospectively at 0 to 2 weeks and at 1, 3, 6, 12, and 18 months to determine development of food allergy in the infants. Infants were all term and classified into 2 groups: high risk because of sibling(s) with food allergy and low risk, defined as having only nonatopic first-degree relatives.

METHODS. Human milk and/or serum samples were obtained from 286 visits with an average of 2 visits per each mother–infant pair. Maternal and infant diets were obtained by using dietary records. Thirty-seven mothers implemented a strict maternal CM avoidance diet within the first 3 months’ postpartum, 49 mothers started a CM elimination diet between 3 and 7 months of breastfeeding, and 56 mothers continued CM in their diet without restrictions. Seventy-five infants in this cohort developed challenge-proven CM allergy. Maternal serum samples and breast milk samples were assayed for casein and β-lactoglobulin (BLG)-specific IgA and IgG by using an enzyme-linked immunosorbent assay. Infants’ sera were evaluated for casein and BLG-specific IgA, IgG, and IgE. The impact of human milk on β-lactoglobulin uptake was assessed in transcytosis assays by using Caco-2 intestinal epithelial cell lines.

RESULTS. Breast milk samples (n = 23) from mothers avoiding CM had lower casein- and BLG-specific IgA levels than milk from mothers (n = 56) with no CM restriction (P = .019 and P = .047, respectively). Their infants had lower serum casein- and BLG-specific IgG1 (P = .025 and P < .001) and BLG-specific IgG4 (P = .037) levels, and their casein- and BLG-specific IgA levels were less often detectable than those with no CM elimination diet (P = .003 and P = .007). Lower CM-specific IgG4 and IgA levels, in turn, were associated with infant CM allergy. In the in vitro model for evaluating the transcytosis of BLG through enterocytes, high levels of BLG-specific IgA (the no CM restriction group) in breast milk impaired movement of BLG across the “gut mucosa.”

CONCLUSIONS. Maternal avoidance of CM was associated with lower levels of mucosal-specific IgA levels and the development of CM allergy in infants.

REVIEWER COMMENTS. This article refutes the practice of food avoidance during breastfeeding. Maternal elimination diets resulted in lower levels of breast milk–specific IgA, which was associated with the development of CM allergy in infants. The study found that human milk IgA may play a role in preventing excessive food antigen uptake in the gut lumen and thereby possibly prevent the development of CM allergy. The participants chosen for this study, however, had a significant atopic family history, which could mean application to the general population may not be as straightforward. Further research with elimination diets and other allergenic foods in a less atopic study population is necessary to confirm the relationship between dietary restriction, breastfeeding, and the development of pediatric food allergy.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2014-1817L

Desha M. Jordan, MD
Angela D. Hogan, MD
Norfolk, VA

Increased Food Diversity in the First Year of Life Is Inversely Associated With Allergic Diseases

PURPOSE OF THE STUDY. The investigators sought to test the relationship between food diversity in the first year of life and outcome of allergic diseases.
STUDY POPULATION. There were a total of 856 children included in this study with data available on allergic diseases up to 6 years of age. They were part of a prospective birth cohort called Protection Against Allergy Study in Rural Environments/EFRIAM in which pregnant women were recruited during the third trimester of pregnancy in 2002–2005 in rural Austria, Finland, France, Germany, and Switzerland.

METHODS. Data were collected by using questionnaires identifying a physician’s diagnosis of asthma or food allergy, as well as history of symptoms of allergic rhinitis. Immunglobulin (Ig)E antibodies to common allergens were measured at 4.5 and 6 years of age. Diet records were kept and food diversity scores assigned based on the number of different foods in the child’s diet and by what age the foods were introduced.

RESULTS. There was an inverse dose–response effect between food diversity and asthma even after adjusting for confounders (odds ratio [OR]: 0.74 [95% confidence interval (CI): 0.61–0.89]). There was a 26% reduction in asthma for every additional item of food added in the first year of life. An increased association was found between children with a low food diversity score and development of food allergies by 6 years of age (OR: 0.70 [95% CI: 0.57–0.86]) compared with children with a more diverse diet after adjusting for confounding variables. This variable, however, was no longer statistically significant after excluding children with food allergy within the first year of life. Those with low food diversity were also found to have increased sensitization to food allergens at 4.5 or 6 years of age (OR: 0.72 [95% CI: 0.57–0.90]). No significant association was found between food diversity and allergic rhinitis or sensitization to inhalant allergens. Children with a low food diversity score also had significantly increased levels of Ce germ-line transcript, a marker of antibody isotope switching to IgE (geometric mean ratio: 1.81 [95% CI: 1.21–2.70]) and lower levels of Foxp3, a marker for regulatory T cells that helps limit inflammation (geometric mean ratio: 0.7 [95% CI: 0.51–0.96]). Higher levels of Ce found among children with lower food diversity suggest that increasing food diversity may play a role in inhibiting isotype switching to IgE.

CONCLUSIONS. Introducing an increasing diversity of foods within the first year of life may have a protective effect on development of asthma, food allergy, and food sensitization in children up to 6 years of age. Higher levels of Ce found among children with lower food diversity suggest that increasing food diversity may play a role in inhibiting isotype switching to IgE.

REVIEWER COMMENTS. This study is the first linking increased food diversity in the first year of life with a decrease in allergic diseases. The investigators were careful to limit reverse causality by using multiple models for statistical analysis. The findings of this study are encouraging because the role of nutrition in the development of allergic diseases is still a topic of debate.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2014-1817M

Angela J. Tsuang, MD, MSc
Anna H. Nowak-Wegrzyn, MD
New York, NY

Introduction of Complementary Foods and the Relationship to Food Allergy

PURPOSE OF THE STUDY. The study analyzed the significance of complementary feeding and breastfeeding in association with allergy development.

STUDY POPULATION. This study was a nested case-control trial of 41 infants with food allergy diagnosed by age 2 years and 82 matched controls within a cohort study involving 1140 infants. The infants’ food allergies were confirmed by using double-blind, placebo-controlled food challenges, the gold standard for diagnosing food allergies.

METHODS. Infants with food allergies were recruited from the PIFA (Prevalence of Infant Food Allergy) study in the United Kingdom. Parents kept prospective daily food diaries and were also asked to complete a telephone questionnaire when their infant was 12 and 24 months old. The questionnaire was designed to identify infants with potential food allergies. Infants with potential food allergies based on food diary and telephone questionnaire data underwent skin prick tests and serum-specific IgE tests to common food allergens. Infants provisionally diagnosed as food allergic based on results of their skin prick test or serum-specific IgE tests then underwent double-blind, placebo-controlled food challenges.

RESULTS. Most (95%) mothers initiated breastfeeding. Exclusive breastfeeding occurred for a median of 8 weeks, total breastfeeding occurred for a median of 20 weeks (0–64 weeks), and there was no significant difference between infants who developed food allergy compared with control subjects. However, infants who developed food allergy had a shorter duration of concurrent breastfeeding when cow’s milk was introduced compared with control subjects (5.5 vs 9 weeks; P = .47). The mean age of introduction of solids was ∼20 weeks. Significantly more food-allergic infants were introduced to complementary foods (not necessarily common allergens) at <17 weeks of age than control subjects (35% vs 14%; P = .011). Infants with food allergy were introduced to cow’s milk and peanut significantly earlier compared with the control infants.

CONCLUSIONS. The infants who were diagnosed with food allergy by age 2 years were less frequently breastfed when
Increased Food Diversity in the First Year of Life Is Inversely Associated With Allergic Diseases

Angela J. Tsuang and Anna H. Nowak-Wegrzyn

*Pediatrics* 2014;134;S139

DOI: 10.1542/peds.2014-1817M

**Updated Information & Services**

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:

/site/misc/Permissions.xhtml

**Reprints**

Information about ordering reprints can be found online:

/site/misc/reprints.xhtml
Increased Food Diversity in the First Year of Life Is Inversely Associated With Allergic Diseases
Angela J. Tsuang and Anna H. Nowak-Wegrzyn

Pediatrics 2014;134;S139
DOI: 10.1542/peds.2014-1817M

The online version of this article, along with updated information and services, is located on the World Wide Web at:
/content/134/Supplement_3/S139.2.full.html