



The protective effect of moderate maternal peanut consumption on peanut sensitization and allergy

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Abstract

Background

The Learning Early About Peanut Allergy or LEAP trial found that the early introduction of peanuts in the diet of infants at risk for peanut allergies prevents peanut allergy. The effect of maternal consumption of peanuts on subsequent peanut sensitization or peanut allergy in the LEAP trial has not been studied to date.

Objective

To determine whether maternal consumption of peanut protein while breastfeeding protects against peanut-allergic outcomes in the absence of peanut consumption in infants.

Methods

We performed an analysis of the data from the peanut avoidance arm of the LEAP study to discern the effects of maternal consumption of peanuts while pregnant and breastfeeding on an infant's peanut-allergic outcomes.

Results

Of the 303 infants in the avoidance group, 31 mothers consumed more than 5 g of peanut per week, 69 consumed less than 5 g of peanut per week and 181 did not consume peanut while breastfeeding. Peanut sensitization ($P=.03$) and peanut allergy ($P=.07$) occurred less frequently in infants whose mothers consumed a moderate amount of peanuts while breastfeeding when compared with those who either did not consume peanuts while breastfeeding or those who consumed a large amount of peanuts when breastfeeding. Ethnicity (odds ratio [OR], 0.47; $P=.046$, 95% confidence interval [CI], 0.22-0.99), baseline peanut skin prick test stratum (OR, 4.87; $P<.001$, 95% CI, 2.13-11.12), no maternal peanut consumption while breastfeeding (OR, 3.25; $P=.008$, 95% CI, 1.36-7.77), and baseline SCORing Atopic Dermatitis greater

than 40 (OR, 2.78; $P=.007$, 95% CI, 1.32-5.85) were all significant contributors to peanut sensitization or allergy at 60 months of age.

Conclusion

Moderate consumption (<5 grams per week) of peanuts while breastfeeding provides a significant protective effect against peanut sensitization and a noticeable but not statistically significant protective effect against peanut allergy later on in life in high-risk infants in the context of delayed peanut introduction.

Introduction

The developing fetus, and subsequently infant, is nourished through a relatively limited number of sources beginning with the maternal diet in the prenatal period and continuing to either breastmilk or infant formula in the months immediately after birth. The World Health Organization recommends exclusively breastfeeding until 6 months of age,¹ after which solid foods are introduced into the diet, vastly expanding an infant's exposure to different tastes, textures, nutrients, and allergens. Several studies have reported the protective effects against developing food allergies of allergen exposure in the early months after solid-food introduction and the early introduction of allergenic foods, specifically peanuts, and is now widely recommended by societies in the United States,^{2,3} the United Kingdom,⁴ the European Union,⁵ Canada,² Japan,⁶ Australia,⁷ and elsewhere.

The dual allergen exposure hypothesis posits that epicutaneous allergen exposure leads to the development of allergy, whereas sustained early exposure to food allergens allows for the acquisition of oral tolerance.⁸ The theory and its implications are especially important in the first few months of a baby's life when early sustained exposure to most allergens are not possible. A number of the trials performed in recent years to exhibit the protective effect of early allergen consumption and have reported allergic sensitization to a variety of allergens before the initial consumption of allergens.^{9, 10, 11} Whereas the manner in which sensitization occurred in these infants is not fully understood, environmental exposure and allergen shedding through human milk may be partially responsible. The former has been correlated with allergic outcomes¹² and the latter has been found to induce oral tolerance in mice.^{13,14} Allergen shedding through human milk is a poorly understood phenomenon,¹⁴ as the amount of allergen consumed that passes through to human milk varies. In addition, the timing, amount, and consistency of allergen exposure leading to allergic sensitization is not well defined.

Findings from the general population Canadian Healthy Infant Longitudinal Development birth cohort supported a "triple exposure" hypothesis, whereby the combined early introduction of peanuts, breastfeeding and maternal peanut consumption while breastfeeding reduced peanut sensitization at 1, 3, and 5 years of age.¹⁵ The recently published results from the Breastfeeding and Eating Nuts and Eggs for Infant Tolerance (BENEFIT) randomized pilot trial were inconclusive as to whether maternal egg and peanut consumption while breastfeeding reduced egg and peanut-allergic outcomes.¹⁶ An additional randomized controlled study is currently underway to study the effect of a maternal diet rich in eggs and peanuts from pregnancy through lactation on immunoglobulin E-mediated egg and peanut allergy outcomes.¹⁷

The results of the Learning Early About Peanut Allergy (LEAP) study, published in 2015, revealed a dramatic reduction in peanut allergy after the early introduction of peanut protein in a high-risk cohort.¹⁸ Owing to the high-risk nature of the cohort, infants with severe eczema and/or egg allergy, and the avoidance of peanut consumption in the control arm, 47/303 (15%) participants in the avoidance group had a positive response to an oral food challenge (OFC) at 60 months and 63/303 (19.6%) participants had a skin prick test (SPT) with a wheal greater than or equal to 3 mm at 60 months. Therefore, the control arm of the LEAP

study represents an opportunity to look at the effects of maternal peanut consumption while breastfeeding on peanut-allergic outcomes in the context of delayed peanut introduction in infants at high-risk for developing peanut allergy.

Section snippets

Participants

We performed an analysis of the LEAP study data, a randomized, open-label, controlled trial designed to determine whether early consumption of peanut in high-risk infants would prevent peanut allergy at 5 years of age.¹⁸ This study was not part of the original LEAP study statistical analysis plan or protocol.

The complete description of the original LEAP study design and study procedures have been described previously.¹⁸ Briefly, infants with severe eczema and/or egg allergy was enrolled between ...

Results

Of the 640 infants randomized into the trial, 615 completed the trial and underwent both SPT and OFC assessments for peanuts at 60 months of age without inconclusive results. 312 out of the 615 patients were in the consumption group and 303 were in the avoidance, or control, group (Fig 1). No significant differences in maternal peanut consumption throughout the breastfeeding period was noted between the consumption and avoidance groups (eFig 1, eTable 1). We performed all analyses in this...

Discussion

The results of our analysis of the LEAP Study cohort imply a protective effect of limited peanut consumption while breastfeeding on peanut sensitization in high-risk infants in the context of delayed peanut introduction. Infants whose mothers consumed up to 5 grams of peanut protein weekly were less likely to develop a peanut allergy or sensitization at 60 months of age and infants whose mothers did not consume peanuts while breastfeeding was more likely to be sensitized to peanuts at any one...

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