

Atopy prevention in childhood: the role of diet

Prospective 5-year follow-up of high-risk infants with six months exclusive breastfeeding and solid food elimination

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Prophylaxis of atopic diseases has been a topic of interest and controversy for several years. Genetic and environmental factors and feeding habits contribute to the development of atopy. Hereditary risk is a strong indication for efforts to prevent or at least to postpone the manifestation of atopic symptoms. Environmental and indoor irritants as well as viral infections or even the season of birth may influence sensitization. Exposure to allergenic food, the age of the infant, gut permeability, microbial flora of the gut and the amount of antigen are all influencing factors.

Maternal elimination diet during late pregnancy seemed not to be protective against atopy (1, 2), however, elimination diet during lactation was beneficial for high-risk infants and reduced the development of atopic eczema during infancy (3, 6). The controversial role of breastfeeding has given favourable outcome in many studies (7, 10), but also results of no effect (11, 13). Combining exclusive breastfeeding with maternal and infant elimination diet gives the most beneficial result (3, 5, 6).

The choice of suitable formula becomes actual when breastmilk is not available. Cow's milk and soya formulas is not a generally recommended choice for prophylactic purposes, but the use of highly hydrolysed casein or whey-based formulas may show benefits in high-risk infants if not breast-fed (3, 14).

The role of solid feeding has shown a clear association between the diversity of the child's diet during the first months of age and risks of eczema (15, 16) whereas delayed introduction of a single allergen only postponed, but not prevented single food allergy (17).

The purpose of the present five-year prospective follow-up study of allergy prophylaxis was to determine the benefits of exclusive six months breastfeeding combined with delayed introduction of solid foods in children at high risk for atopic disease.

Subjects and methods

The original study group consisted of 135 infants of atopic parents (1). All children had positive atopic heredity, similarly in both groups. All children received breast-milk without any cow milk supplements for the first six months. Half of the children, 65 infants, were exclusively breast-fed without any solid food up to 6 months of age, and 70 infants started solid feeding at three months of age. Maternal diet was free. Fifty-one children of the exclusive breast-milk group and 62 of the solid-food group could be reached for re-examination at the age of five years.

Examination at age 5 years

- history of food allergy (repeated skin rash, urticaria or heavy vomiting after ingestion)
- history of seasonal symptoms or symptoms associated with animal contacts (nasal discharge, itching conjunctivitis, wheezing during pollen season or at animal contacts)
- skin prick tests (birch, alm, timothy, mugwort, dog & cat epithelium, fish, milk & wheat)

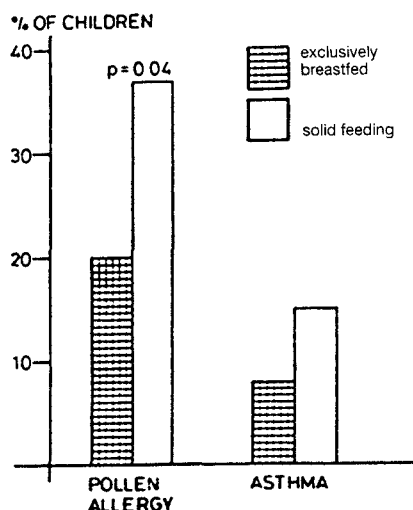


Fig. 1. Asthma and pollen allergy at the age of 5 years. Shadowed area indicates children of the exclusive breastfed group.

Diagnosis of atopic disease

- 1) Atopic eczema at the time of examination
or
- 2) Diagnosis of asthma
or
- 3) Prick-test positive corresponding with the history of food, pollen or animal dander allergy, respectively

Suspicion of atopic disease

- 1) Positive history but negative prick tests
or
- 2) Positive prick test but negative history

Results

Atopy was common in these 5-year-old children, 39 (33%) children of the total 113 were regarded as atopic. Atopic disease was more common in the solid food group, occurring in 40% compared to 27% in the exclusive breast milk group ($p=0.15$). If suspicion of atopy also was considered, the portions were 50% and 35%. Atopic eczema was discovered equally in both groups, 24%, at the time of examination.

The first examination at the age of one year showed a significant difference between the groups, atopic eczema and history of food allergy occurring more frequently in the solid-food group (15).

The growing importance of pollen allergy and atopic airway disease was observed at the age of five years. Pollen allergy was diagnosed in a total of 28% of the children, 37% of the solid-food group, and 20% of the exclusive breast-milk group ($p=0.04$) (Fig. 1).

Asthma was verified in a total of 13 children, 8% versus 15%. The exclusively breastfed group showed the benefit but the difference did not reach statistical significance (Fig. 1). All children with asthma in both study groups also had pollen allergy.

In this age range, food allergy was of little importance and no differences were seen between the child groups. Four of the exclusively breast-fed group and 6% in the solid-food group also suffered from fresh fruit allergy associated with birch allergy. Allergy to animal dander also occurred in similar proportions in both groups, 8% and 10%, respectively (Fig. 2).

Discussion

The late introduction of solid feeding besides breast-feeding seems to have long-lasting benefits on the development of atopic diseases and especially on pollen allergy in high-risk children (Fig. 1).

Atopic disease was common in both groups indicating a strong hereditary influence. The groups differed only in respect to solid feeding during 3 to 6 months of age.

The mode of feeding during the first few months of life shown to influence the atopic presentation (9, 16). The burden of genetic forces is significant and a distinction must be made between infants with or without atopic heredity and the emphasis directed at children of atopic families (18, 19). The highest accumulated prevalence of atopic disease has been found in offspring of two atopic parents with the same type of atopy (18).

Food allergy and atopic eczema were common in the solid feeding group at the age of one year (15), probably serving as a preceding symptom for further atopic manifestation. At the age of five years, food allergy was only a minor complaint in both groups. Atopic eczema was equal in both groups, 24%.

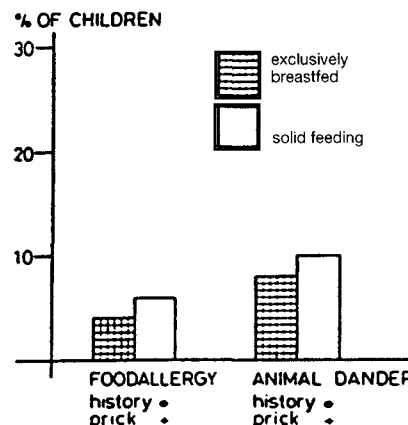


Fig. 2. Food allergy and allergy to animal dander at the age of 5 years. Shadowed area indicates children of the exclusive breastfed group.

The significant difference regarding pollen allergy, 37% vs 20%, and the distinction between the occurrence of asthma, 15% vs 8%, showed the long-lasting benefit of exclusive breastfeeding combined with the postponement of solid feeding.

The influence of early or late solid food introduction seems to be non-specific, since the food items given were in general not responsible for the atopic symptoms. The dietary diversity seems to be associated with increased risks of atopic manifestations (16).

In the present study the maternal diet was free, but mothers spontaneously avoided great amounts of egg, fish and citrus fruit in both groups. Maternal elimination diet during lactation possibly enhances the beneficial effects of breastfeeding. Breastfeeding decreases allergic sensitization both by reducing the exposure and intestinal absorption of food antigens. In the present material the breast milk protection was similar for all infants and the only differing factor was the initiation of solid feeding.

According to the present study, promising prolonged protection can be achieved by exclusive six months breastfeeding without solid foods. In atopic families, mothers with abundant breast milk supply should be encouraged to continue exclusive breastfeeding without solid foods up to 6 months.

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