Complementary Feeding and Enteropathies

Introduction

Since the discovery, in the early 1950s, that gliadin was the component of wheat responsible for celiac disease (CD), and, during the 1960s that cows’ milk proteins could also trigger severe enteropathies, it has been shown that early introduction of many other foreign proteins—from soy, rice, eggs, fish, and chicken—could have the same deleterious effect: a T-cell mediated immune reaction leading to mucosal inflammation with villous atrophy, diarrhea, and failure to thrive.1,2

Research Priorities

1. At what age is the risk of developing a protein-induced enteropathy so low that feeding a foreign protein can be considered safe?

   Protein-induced enteropathies are development-related disease states. In all published series of cows’ milk-intolerant patients, it has been found that the earlier cows’ milk is introduced in the diet, the greater the risk of developing such enteropathy. It has been shown that a single bottle of cows’ milk-based formula given during the first days of life could sensitize the newborn to cows’ milk proteins. On the other hand, most of the same intolerant infants become tolerant to cows’ milk after the first year of life and nearly all are tolerant after 3 to 5 years of age.3 That protein-induced enteropathy is, indeed, transitory, distinguishes it from CD, a permanent, lifelong condition and is strong evidence that it is secondary to a state of immaturity. Although gut permeability may be increased during the first days of life, it seems that these enteropathies are mainly linked to the immaturity of the gut immune system driving the immune response toward sensitization instead of tolerance.4 Although it is commonly thought that this period of immaturity lasts for a few months, it is not precisely known when feeding a foreign protein could be considered safe, after 3, 4, 6, and 9 months of age. Prospective cohort studies of infants starting formula at various ages could shed some light on this obviously important question.

2. Are small quantities of protein less pathogenic than greater ones?

   Whereas it is known that minute amounts of proteins may be more detrimental than greater amounts when considering immunoglobulin E (IgE)-mediated reactions of intolerance, there is no such knowledge regarding T-cell mediated reactions. Early reports of protein induced enteropathy concerned infants receiving sizeable amounts of other proteins such as soy during prolonged periods of time often as a substitute of cows’ milk proteins. Although small amounts of proteins are known to trigger increased mucosal permeability in patients with atopic dermatitis,5 no data are available regarding a possible threshold amount below which a given foreign protein could be ingested without harm.

3. In at-risk infants with a family history of allergy, early solids (given in addition to breast milk from 3 to 6 months of life) significantly increased the risk of developing eczema or digestive symptoms compared with those breastfed exclusively under 6 months of age.6 Furthermore in a prospectively followed cohort of >1000 nonelected children, it was clearly shown that the risk of developing eczema was related to family history and to precooked ingestion of solids; the risk of having eczema was significantly correlated to the number of different foods introduced simultaneously.7 Such knowledge is lacking regarding protein-induced enteropathies; it could be gained from the study of prospectively followed infants with different programs of introduction of complementary foods. It should be remembered, however, that answers to such a question would be difficult to obtain considering the low prevalence of enteropathies among food allergy manifestations (<10%).

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References

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*Pediatrics* 2000;106;1286

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