

Elimination diet and intestinal permeability in atopic eczema: a preliminary study

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Summary

We measured small intestinal permeability to lactulose and rhamnose in 18 healthy children and in 15 children with atopic eczema, before and after a 14-day elimination diet. The children with atopic eczema had higher initial urinary lactulose/rhamnose ratios than the controls. After dietary restriction, there was no overall change in permeability. Dietary therapy did however result in a large reduction in permeability in three of the nine children whose skin disease was improved, but a statistically significant decrease in permeability was not observed in the diet-responsive group as a whole. Larger studies would be required to confirm that dietary restrictions can reduce intestinal permeability in some children with atopic eczema.

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Introduction

Hypersensitivity reactions to food appear to play an aetiological role in at least some cases of atopic eczema (AE). Elimination diets may sometimes be beneficial [1–3], and appropriate challenge may result in exacerbation [4,5].

The pathogenetic mechanisms responsible for AE are not fully understood. The provocative role of foods might be mediated by hypersensitivity reactions of type I [6], III [7] or IV, or by other mechanisms.

After food challenge in subjects with AE, the circulating level of macromolecular antigens appears to be greater than in normal controls [8,9]. Furthermore, small intestinal permeability in children with AE is frequently enhanced when measured with polyethylene glycol (PEG) [10], or the inert disaccharide, lactulose [11,12]. There is, however, no indication of the relevance of these findings, nor is there any evidence of a correlation between enhanced lactulose permeability and permeability to macromolecular antigens [13–15].

The object of the present study was to assess intestinal permeability to inert sugars, before and after an elimination diet, in children with AE. L-rhamnose (Rh) and lactulose (LL) [16,17] were selected for the measurement

of intestinal permeability, because they are not metabolized, and are therefore, recovered intact in urine [18]. In contrast with PEG, they are poorly lipid-soluble and therefore unlikely to cross enterocyte cell membranes [12,19]. The monosaccharide, Rh (MW 164), is passively absorbed through small pores in the enterocyte cell membrane [17]; the disaccharide, LL (MW 342), is normally only absorbed in minute quantities, probably through larger channels between enterocytes [17]. The LL/Rh excretion ratio in urine provides an index of permeability, since both sugars are identically influenced by variables such as the rate of gastric emptying, intestinal dilution and transit, systemic distribution, metabolism, renal clearance and urinary excretion [19].

Patients and methods

We studied 15 children with clinically typical AE (5 girls, 10 boys; age range: 7 months–13.3 years, mean 7 years). We used a control group of 18 healthy children (9 girls, 9 boys; age range: 3 years–12.5 years, mean 10.5 years). None of the controls had a history of eczema, asthma, hay fever, allergic rhinitis, gastrointestinal disorders or food allergy.

The patients were skin-prick tested (SPT) with extracts (Bayropharm-Milano, Italy) of hen's egg, cows' milk, goats' milk, pea, cereals, bean, apricot, pear, peach,

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bility in the diet-responsive group compared to the diet non-responsive group at the end of the study ($P < 0.01$). At the end of the study there was no significant difference between permeability in the diet-responsive group and the control group, while permeability in the non-diet-responsive group remained significantly higher than that of the controls ($P < 0.01$) (Fig. 3).

Discussion

Our results concur with those of several previous studies that demonstrate enhanced gastrointestinal permeability to small inert molecules such as LL in children with AE [10–12]. There was a large decrease in the permeability of three of the nine children who responded to dietary treatment, but this did not result in a statistically significant reduction in permeability in the diet-responsive group as a whole. A larger study would be required to clarify the situation. Enhanced permeability did not appear to predict a therapeutic response to dietary treatment.

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