

Celiac Disease in Children and Adolescents With Type I Diabetes: Importance of Hypoglycemia

This article explores the association of celiac disease and type 1 diabetes mellitus in a retrospective case-controlled study. Patients with type 1 diabetes mellitus were screened for celiac disease by measurements of both serum immunoglobulin (Ig)A antiendomysial (EMA) and anti gliadin (AGA) antibody levels. The diagnosis of celiac disease was confirmed by small-bowel biopsy when testing for EMA and/or AGA antibodies was positive. Patients were matched for age, sex, and duration of disease for the 18 months before and after the diagnosis of celiac disease. Metabolic control was assessed by hemoglobin A_{1c}, frequency of hypoglycemia, and total insulin requirements for the 18 months before and after the diagnosis of celiac disease.

There were 20 patients of 434 with type 1 diabetes who had celiac disease. None of them had symptoms or signs typical of this disease. However, during the 6 months before and after diagnosis of celiac disease, these patients had more hypoglycemic episodes than the controls: 4.5 vs 2 severe episodes with a progressive reduction in insulin requirement of 0.6 vs 0.9 μ /kg/d. The introduction of a gluten-free diet led to normalization of the intestinal mucosa and reduced the frequency of hypoglycemia in the celiac disease patients. The prevalence of celiac disease in this population of type 1 diabetes mellitus was 4.6%. All 414 control patients had negative tests for EMA and AGA antibodies. The authors concluded that underlying celiac disease should be suspected in patients with diabetes mellitus presenting with symptomatic hypoglycemia.

Mohn A, et al. *J Pediatr Gastroenterol Nutr* 2001;32:37-40.

Editor's comment: The association between celiac disease and type 1 diabetes has long been known. The coexistence of these 2 entities appears to be due to a common genetic predisposition attributed to the presence of the locus human leukocyte antigen (HLA) DR3. This report, as well as other studies using serologic data, describe a celiac disease prevalence of 5% to 7% in patients with type 1 diabetes mellitus. Often these patients do not present with any symptoms of overt malabsorption. However, as the authors point out, the occurrence of hypoglycemia in a child with diabetes mellitus should lead to screening for celiac disease. Measurements of EMA or AGA antibodies should be obtained, and, if positive, a confirmatory small-bowel biopsy should be performed even in patients who appear to be asymptomatic. These patients may have malabsorption of a sufficient degree to interfere with carbohydrate absorption with a resultant increased risk for hypoglycemia. It should be kept in mind that the prevalence of celiac disease in normal children might be about 1% (Pediatrics 2001;107:42-45), whereas in type 1 diabetes patients the prevalence is at least 4 times higher. Thus, we should proactively consider routine screening for this disease in type 1 diabetes patients, just as we screen for other diseases (eg, hypothyroidism).

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Obesity, Increased Linear Growth, and Risk of Type I Diabetes in Children

Hyponen and associates report for the Childhood Diabetes Study Group in Finland on their evaluation of the effect of obesity and linear growth on the risk of developing type 1 diabetes during childhood. All children under the age of 15 years who had type 1 diabetes diagnosed between September 1986 and September 1989 were invited to participate in the study. All the study participants were tested for antibodies associated with diabetes. Ninety-eight percent were found to be positive for at least 1 type of antibody, confirming that they had autoimmune type 1 diabetes. Age- and sex-matched nondiabetic control children were randomly selected from the Finnish National Population Registry. Neonatal data and sociodemographic data were collected using structured questionnaires. An equal proportion of the diabetic and control children lived in rural areas. Information regarding height and weight was obtained from well baby clinics and school healthcare units for the 586 children with diabetes and for the 571 controls. Heights were available for both parents for the majority of study subjects. Relative weight calculated as "weight in relation to mean weight for height" and relative height as "a deviation of height in SD scores" were computed using the Finnish growth standards. Statistical analysis was based on relative weight and relative height in relation to age. Three age groups were studied: 2 weeks to 1.9 years, 2 to 9.9 years, and 10 years and older.

Neither the mean relative weight nor the relative height at birth differed between the diabetic and control subjects. But both boys

and girls who developed type 1 diabetes weighed more than the control children from infancy onward. There was a significant difference between the diabetic and control boys with regard to relative height from early infancy on. Among the girls, this significant difference was present until 10 years of age. Unfortunately, there were only limited data available for girls after the age of 10 years. Adjustments for neonatal and sociodemographic characteristics, or target heights, did not affect the results of this study. Both *higher relative weight* and *greater relative height* were associated with an increased risk of developing type 1 diabetes, and the magnitude of the effect was somewhat greater with respect to relative weight in infancy and early childhood. The effect of relative height remained constant throughout all ages.

The authors remind us that obesity is a well-known risk factor for type 2 diabetes, and that obesity is an increasing problem in many countries. In Finland, the annual incidence of type 1 diabetes has increased more than 4 times between 1953 and 1998. The role of obesity in this increase is unclear. Unequivocally, the increase in risk of type 1 diabetes for 1 SDS increment in relative height was 20% to 30%. Obesity or relative weight >120% after 3 years of age was associated with a more than 2-fold risk of developing type 1 diabetes. It is known that there is an association between obesity, accelerated height gain, insulin resistance, or enhanced insulin secretion, and significant subsequent enhanced insulin secretion. Hyperinsulinemia is obviously associated with