

## Chronic Intermittent Elemental Diet Improves Growth in Children With Crohn's Disease

Inadequate caloric intake over a prolonged period of time is considered the major cause of growth failure in children with Crohn's disease. However, appropriate nutritional therapy may reverse growth retardation and may even improve the clinical status of children with the disease. Seven boys and one girl, ages 9.8 to 14.2 years, with Crohn's disease and growth failure, were evaluated for a period of one year while receiving standard medical therapy. During the second year of the study, these children were given continuous feedings of an elemental diet (Vivonex) at night by nasogastric tube. These feedings were given for one month every four months for a total of three months of nutritional therapy. Four children, matched for age and disease, received standard medical therapy throughout the two years of the study. The parameters measured in all children were height, weight, triceps skinfold and mid-arm circumference measurements, Tanner stage of sexual development, the Crohn's disease activity index (CDAI), bone age, and prednisone intake. Hemoglobin, lymphocytes, serum albumin, iron, total iron-binding capacity, folic acid, and urinary creatinine were also evaluated.

Children receiving the intermittent elemental diet showed an increased annual mean growth velocity of  $7.0 \pm 0.8$  cm, as compared with their previous growth velocity of  $2.9 \pm 0.4$  cm. During the same period, children in the control group had a growth velocity of  $1.7 \pm 0.8$  cm ( $P < 0.01$ ). Significantly, patients treated with the elemental diet had greater weight gains, increased triceps skinfold thickness and arm muscle circumference, and increased creatinine excretion. In addition, the CDAI and prednisone

intake were reduced during the year of elemental diet feedings, compared with levels during the year of standard therapy and in the control group ( $P < 0.001$ ). However, no differences were noted in the advancement of bone age and pubertal development and in other biochemical and nutritional parameters between the groups.

Belli DC, Seidman L, Bouthiller AM, et al. *Gastroenterology* 1988; 94:603-610.

**Editor's comment**—This well-designed study provides further evidence that nutritional rehabilitation of children with Crohn's disease may reverse growth retardation and promote clinical improvement. In particular, it showed that intermittent elemental enteral feedings, given for one month out of every four months for one year, are sufficient to triple the growth rate. The mechanisms whereby elemental enteral feedings improved growth go beyond the provision of calories. The enteral feedings not only provided calories, but all necessary nutrients, while eliminating all other food intake. Additionally, children received supplemental vitamin K, folic acid, and more importantly, elemental iron. Any one or all of these nutrients could have contributed to the improved growth.

The effect of "bowel rest" while the children receive infusions of monomeric enteral feedings also may have played a role in reducing the antigen load and decreasing the disease activity. This may have reduced steroid needs, thereby allowing for more growth. The lessening of the inflammatory intestinal process may have also resulted in decreased energy needs by reducing the hypermetabolic effects of the diseased bowel and by alleviating anorexia. Whatever the mechanism, nutritional rehabilitation of Crohn's disease patients is essential, and should be attempted even before growth failure occurs.

*The nutritional dwarfing of children with Crohn's disease is evident, even though they appear well adapted to decreased nutrient intake. Often, dietary intake is not reduced below the level needed to maintain body weight and height, but is insufficient for normal growth. Only stable isotope measurements may detect malnutrition in well-adapted Crohn's disease patients whose growth has slowed as an adaptive response to decreased nutrient availability. Treatment must include provision of all the necessary nutrients for growth, with surgery contemplated only if appropriate nutritional therapy fails.*

Fima Lifshitz, M.D.

## Growth of Immigrant Children in the Newcomer Schools of San Francisco

This study evaluated the effects of migration and nutritional change on the heights and growth velocities of four groups of immigrant children (Chinese, Filipino, Hispanic, Southeast Asian) who were 5 to 12 years of age when they enrolled in one of three San Francisco schools. A low score on an English-language achievement test was the criterion for study entry. Education regarding nutrition was provided during the study.

At the initial examination, all four groups had mean heights and weights between the fifth and 25th percentiles, as calculated by United States reference population growth curves. In general, the Hispanic and Filipino children were above the mean when weight was compared to height (>50% of children exceeded the mean), and the majority of the Chinese and Southeast Asian children were underweight for their height. During 12 months of observation, the children in all groups showed catch-up growth, with the growth velocities being above the 50th