The Effect of Small But Sustained Elevations in Circulating Growth Hormone on Fuel Metabolism in GH Deficiency

This study was designed to examine the effects of maintaining modest but constant levels of circulating growth hormone (GH). To test the hypothesis that some of the metabolic consequences of acromegaly might be attributable to the loss of the normal pulsatile pattern of GH release, Tamborlane and co-workers examined the effects of continuous subcutaneous infusions of GH (CSIGH) on glucose tolerance and apparent insulin sensitivity.

To eliminate the variability introduced by endogenous GH secretion, eight children and adolescents with GH deficiency and 12 normal controls were tested. An oral glucose tolerance test was performed. A 90-hour subcutaneous infusion of GH (corresponding to 0.05 U/kg/24 h) then was started in the GH-deficient patients. On the morning of the fourth day, a second oral glucose tolerance test was done. The results of the glucose tolerance tests were compared with those in seven nonobese children and adolescents.

CSIGH produced small but sustained elevations in GH concentrations (mean, 5.9 ng/ml with a coefficient of variation [CV] of 21%). The normal controls (no infusion) had a mean of 10.1 ng/ml, but a CV of 105%. CSIGH had no significant effects on fasting plasma glucose or insulin levels, but sharply altered oral glucose tolerance (plasma glucose was 30 to 40 mg/dl above preinfusion values). This occurred despite a virtual doubling of insulin secretion during the test.

Only transient changes in fasting free fatty acid concentrations were found, and no significant changes were noted in the fasting concentrations of alanine or branched-chain amino acids. After CSIGH, somatomedin-C (Sm-C) levels increased sharply in two subjects, but remained virtually unchanged in five.

Tamborlane WV: *Pediatr Res* 1984; 18:212.

Editor's comment—It appears that the intermittent pulsatile signal of GH release is as important for maintaining fuel homeostasis as the intermittent secretion of gonadotropin-releasing hormone for the gonadal axis. The sustained nature of constant GH levels, even at a relatively low concentration, is sufficient to induce marked derangements in oral glucose tolerance and insulin action. In five of seven children, these actions occurred in the absence of elevated Sm-C concentrations. Thus, the actions of GH on intermediary metabolism may be the direct effects of GH. For our colleagues who take care of adult patients, these data suggest that severe metabolic alterations and their long-term consequences may accompany so-called mild acromegaly. Since these moderately elevated concentrations of GH can cause metabolic derangements, it may be that anyone whose GH levels are not suppressed into the unmeasurable range is at risk for the continuing metabolic complications of GH excess.

Meeting Calendar

April 13-18 American Academy of Pediatrics Spring Session. Atlanta, Georgia. Contact: American Academy of Pediatrics, 1801 Hinman Avenue, Evanston, IL 60204

May 7-10 American Pediatric Society, Society for Pediatric Research, and Ambulatory Pediatric Association Annual Meeting. Sheraton Washington Hotel, Washington, DC. Contact: Charles B. Slack, Inc., 6900 Grove Road, Thorofare, NJ 08086

May 22-25 4th International Clinical Genetics Seminar. Endocrine Genetics and the Genetics of Growth. Athens, Greece. Contact: Dr. Christof Vartsocas, 47 Vasilissis Sofiais Avenue, Athens 140, Greece

June 15-18 American Society for Bone and Mineral Research Meeting. Washington, DC. Contact: Shirley Hohl (707) 279-1344

June 16-18 45th Annual Meeting and Scientific Sessions of the American Diabetes Association. Baltimore Convention Center, Baltimore, Maryland. Contact: Carolyn Sciortino, ADA, 2 Park Avenue, New York, NY 10016

June 19-21 67th Annual Meeting of The Endocrine Society. Baltimore Convention Center, Baltimore, Maryland. Contact: The Endocrine Society, 9650 Rockville Pike, Bethesda, MD 20814

June 22-25 Second Joint Meeting of the Lawson Wilkins Pediatric Endocrine Society and the European Society for Pediatric Endocrinology. The Hyatt Regency, Baltimore, MD

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