

Editorial

Growth Hormone (GH) Treatment in Non-GH Deficient Chronic Disease

Cystic fibrosis (CF) is the most frequent fatal genetic disorder in the US [1]. At birth, infants with CF have a mean length close to normal, but by age 4 months they have a mean height SDS of only -1.3 SD. After the age of 12 months, they do experience some catch-up growth resulting in a mean height SDS of -0.3 SD by 5 years of age [2]. Further growth is probably largely dependent on the severity of the disease. Data from the registry maintained by the Cystic Fibrosis Foundation suggests that approximately 40% of CF patients are below the 5th percentile for height and 36% are below the 5th percentile for weight [3].

Although generally thought of as a chronic lung disease, there are significant nutritional problems that produce an energy deficit in many CF patients sufficient to limit linear growth and weight gain. These include poor calorie intake related to anorexia, increased nutrient losses through malabsorption and increased energy requirements due to their disease [4]. This energy deficit is associated with increased morbidity and mortality [5].

Is there a role for biosynthetic human growth hormone (HGH) in the treatment of cystic fibrosis? Human growth hormone is well known for its anabolic effects on protein synthesis and cell growth [6]. In patients with other catabolic conditions such as sepsis [7], burns [8] and trauma [9], studies have demonstrated decreased urinary nitrogen excretion, increased protein synthesis and resultant increases in lean-body mass. The study by Alemzadeh, Upchurch and McCarthy in this issue of JACN [10] adds data to the limited experience already reported on the short-term effect of HGH in CF patients [11–13].

At present, HGH is FDA approved as safe and effective for treatment of three very different conditions: pituitary growth hormone deficiency, Turner Syndrome, and chronic renal failure. Turner Syndrome is the prototype for successful HGH treatment of a form of genetic short stature; chronic renal failure is the prototype for successful HGH treatment in a non-HGH deficient chronic disease state. Treatment of CF with HGH would appear to fall into the latter category.

Alemzadeh and his co-authors have shown a significant but short-term increase in both height and weight z scores in five very young patients with CF. The findings suggest that HGH may increase the lean body mass in CF patients. Greater lean

body mass has been associated with improved pulmonary function [14] and decreased morbidity [15] in CF. Growth hormone treatment also resulted in significant increases in mean IGF-1 and IGFBP-3 values in this group. A similar increase in growth rate was previously reported in a group of 24 patients enrolled in the National Cooperative Growth Study (NCGS) [16], a large database from a multi-center study.

While the Alemzadeh study adds to our knowledge of the short-term HGH effect in another non-GH deficient disease state, the most important questions about long-term safety and efficacy remain to be addressed. Many of the concerns recently reported about safety of HGH treatment in renal transplant patients (scoliosis, pigmented nevi, pancreatitis, glucose intolerance) [17] could be applicable to HGH treatment in other chronic diseases such as cystic fibrosis.

The ultimate effect of HGH treatment on pulmonary function, nutritional status, adult height and weight, morbidity, mortality and quality of life must still be addressed in cystic fibrosis and the many other currently “unapproved indications” [18] in which growth hormone is being used.

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