Quality-of-Life Assessment of Adults with Growth Hormone Deficiency
Implications for Drug Therapy

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Summary

Growth hormone (GH) deficiency in adults affects many physiological functions. It may result in reduced muscle volume and strength, changes in body mass, lowered metabolic rate, low energy and sexual drive and impaired cognitive function. GH deficiency may also lead to an increase in mortality due to vascular disorders. However, the benefits of GH replacement are still controversial.

Recently, investigators have looked at the effects of GH replacement therapy on the well-being of patients. However, the studies which have been published generally have small sample sizes, use inadequate methodology and employ health status measures that lack the necessary sensitivity. Despite these weaknesses, results suggest that replacement GH does have a positive effect on well-being.

A GH-specific quality-of-life measure has now been produced, which will provide a clearer view of the benefits of replacement therapy for patients. The use of this measure should help guide decisions about the necessity of providing replacement therapy for GH-deficient patients.
1. Growth Hormone (GH) Deficiency in Adults

Human growth hormone (GH) has been used for the treatment of GH-deficient children for almost 30 years. Since 1985, biosynthetic GH has been available, allowing other conditions involving GH deficiency to be treated. Such treatment in adults has been shown to improve patients' physical condition and general well-being.\[1\]

The pituitary gland produces GH throughout life, even after bone growth is complete. However, GH production falls by a mean of 14% during each decade of life, leading to the decrease in lean body mass, increase in adipose tissue mass and thinning of the skin that occur with advancing age. Investigating the effects of GH replacement therapy in men with low endogenous GH levels, Rudman and colleagues\[3\] found that rejuvenescence changes in lean body mass and adipose tissue mass occurred which were equivalent to 10 to 20 years of aging. Such findings have led to suggestions that GH may be an 'elixir of youth'. This conclusion is, however, somewhat premature, and more research is required before GH could be licensed for use in otherwise healthy individuals.\[4\]

At times of physical or emotional stress, bursts of the hormone are released.\[5,6\] GH deficiency in adults usually results from tumours in the region of the pituitary gland or from treatment of these, and occurs in about 10 people per million annually.

GH-deficient adults have increased body fat, reduced lean body mass and a high waist-to-hip ratio. Muscle strength, exercise performance, and anaerobic threshold are also impaired. Plasma cholesterol levels are increased, especially low density lipoprotein (LDL) cholesterol.\[7\]

There is evidence that patients with GH deficiency have an increased risk of cardiovascular disease. A retrospective study of over 300 patients with GH deficiency, treated with routine hormone replacement therapy, but not GH, found them to have a higher overall mortality than that of a population matched for age and sex.\[8\] Furthermore, the deficient patients had almost twice the risk of death from cardiovascular disorders.

In recent years a number of clinical trials have investigated the effect of GH replacement therapy in deficient adults.\[9-14\] Treatment has been shown to have a significant effect on body composition, energy levels, glucose and fat metabolism, muscle mass, muscle strength and exercise performance. The most common adverse effects of treatment are fluid retention and an initial increase in body-weight. However, compliance with treatment is good.\[17,91\]

It is still not generally accepted that GH deficiency in adults is a disease, despite the evidence available from clinical trials and anecdotal reports of the benefits that patients gain from replacement therapy. This has led investigators to examine the benefits of treatment on quality of life of GH-deficient patients.

Quality of life can be thought of as the effect of an illness and its treatment on a patient. When properly assessed, it provides valuable information about the benefits of treatment from the patient's viewpoint. In chronic conditions such as GH deficiency, quality of life is the major determinant of whether or not the patient will accept the treatment prescribed.

2. GH Deficiency and Quality of Life

Treatment with GH has been shown to increase exercise capacity, muscle strength, endurance and physical fitness, and to improve vitality, mental alertness, feelings of well-being and appetite.\[9,15-17\] All of these variables might be expected to improve quality of life.

Relatively few studies assessing quality of life associated with GH deficiency have been published. Patients who have had GH deficiency in childhood have been shown to achieve normal educational attainment, but are less likely to be employed or married than members of the general population. Relatively few hold a driving licence and they tend to be less involved in leisure activities.\[18,19\]

Studies which have used patient-completed measures have selected either the Nottingham Health Profile (NHP) and/or the Psychological