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Review

Evaluating the Impact of Growth Hormone Deficiency Treatments on Quality of Life

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Abstract

Childhood and adult patients with growth hormone deficiency (GHD) experience a variety of physical, metabolic, and psychological problems that collectively lower quality of life (QoL). Recombinant human growth hormone (rhGH) has transformed treatment by improving growth body composition, energy levels, and mental health. Nevertheless, further research is needed to determine the full scope of these QoL gains. This review of the literature summarizes current research on how growth hormone (GH) replacement therapy affects GHD patients' quality of life based on longitudinal studies, meta-analyses, and clinical trials. Although GH therapy has demonstrated advantages in several QoL areas, issues still exist, such as patient response variability, the sustainability of long-term treatment, and possible adverse effects. The effectiveness of GH therapy, the methods used to evaluate QoL outcomes, and the necessity of individualized treatment approaches are all clarified by this review's analysis of the most recent data. Future research should validate current QoL tools, assess the long-term safety of GH therapy, and develop improved methods for monitoring treatment outcomes to enhance personalized care and overall well-being in GHD patients.

Keywords: *Growth hormone deficiency (GHD), quality of life (QoL), growth hormone GH replacement, Recombinant human growth hormone (rhGH)*

Introduction

One crucial peptide hormone that controls growth metabolism and general physiological function is the growth hormone (GH) (1). The anterior pituitary gland secretes it and acts through the insulin-like growth factor-1 (IGF-1), which affects many body systems such as cardiovascular health, lipid metabolism, and musculoskeletal development (2). When the pituitary gland is unable to produce enough GH, it results in growth hormone deficiency (GHD), which has a series of detrimental effects on both physical and mental health (3). Genetic mutations, pituitary tumors, radiation therapy, or traumatic brain injuries can all cause congenital or acquired GHD (4). GHD mainly shows up in children as metabolic dysregulation, delayed puberty and growth retardation. Because they are smaller in stature, these kids frequently face psychological and social challenges such as low self-esteem, bullying, and disrupted social interactions (5, 6). A distinct set of symptoms such as decreased muscle mass, increased fat accumulation, exhaustion, low bone density, cardiovascular risk, and cognitive impairments are typically seen in adults with GHD (7, 8). Furthermore, adults with untreated GHD frequently report emotional instability, depression, and decreased overall life satisfaction, underscoring the condition's significant negative effects on quality of life (9, 10).

In the 1980s, recombinant human growth hormone (rhGH) was developed, which revolutionized the treatment of GHD by raising GH levels and reducing the resulting physiological deficiencies (11). Height muscle strength, lipid profiles and general metabolic function have all improved with GH replacement therapy, which has been thoroughly investigated in pediatric and adult populations (12). But the effect of GH therapy on quality of life is more complicated and has produced inconsistent findings in different research (13). While some patients report notable improvements in their emotional stability, social engagement, and physical vitality, others only see slight improvements or find it difficult to cope with the constant monitoring and injections (14, 15). It is methodologically challenging to evaluate QoL in GHD patients receiving GH therapy (16, 17). Since QoL is subjective by nature, it is impacted by a wide range of factors, such as one's treatment expectations, psychosocial context, and baseline health status (18, 19). The Quality of Life-Assessment of GH Deficiency in Adults (QoL-AGHDA), Health-Related Quality of Life (HRQOL), and the Short-Form Health Survey (SF-36) are two examples of the generic and disease-specific QoL assessment instruments that researchers use to gauge results (20, 21). Although these tools offer insightful information, direct comparisons of research findings are made more difficult by variations in study designs, patient demographics, and treatment durations (22). By combining data from observational studies, systematic reviews, and clinical trials this review of the literature seeks to fully assess how GH therapy affects patients with GHD in terms of their quality of life. To present a comprehensive understanding of the advantages and disadvantages of GH treatment, this review will look at how it affects social functioning, psychological well-being, and physical health. In the end, enhancing patient care, directing clinical judgment, and enhancing long-term treatment results for people with GHD all depend on an awareness of the wider effects of GH therapy on QoL.

Methods

A thorough literature search was carried out using databases like PubMed, EBSCOhost, Google Scholar, and Web of Science to find studies published in the last 15 years that assessed the effect of GH replacement therapy on the quality of life in people with GHD. “Quality of life”, “growth hormone therapy”, “growth hormone deficiency”, and “GH replacement” were among the search terms used. Observational studies, meta-analyses, and randomized controlled trials that evaluated the quality of life after GH therapy in both adult and pediatric populations were included in the inclusion criteria. Excluded were studies that only examined physiological results without evaluating quality of life. Key findings about QoL outcomes, treatment duration, population characteristics, study design,

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and QoL assessment instruments were the main topics of data extraction.

Discussion

Growth Hormone Therapy's effects on the psychosocially

Since untreated GHD frequently results in psychosocial distress due to short stature, the psychological and social effects of GH therapy are especially important for pediatric patients (23). Bullying, social exclusion, and low self-esteem are commonplace for kids with GHD, and these issues can have a detrimental effect on their emotional health (24). Through encouraging height gain, GH therapy has been demonstrated to allay some of these worries, resulting in improved social integration and heightened self-confidence (25). Individual psychological benefits, however, differ because some kids still struggle with anxiety and body image issues after reaching catch-up growth. Individual psychological resilience, social environment, and family support are crucial factors in determining how well GH therapy improves self-perception (26). In addition to increasing height, GH therapy also improves general energy levels and physical activity participation, which supports emotional and social well-being (27). However, for some kids, the actual treatment process can be stressful, especially because of the daily injections, frequent checkups with the doctor, and the uncertainty surrounding the final adult height result (28, 29). Teenagers making the switch from pediatric to adult care frequently have trouble sticking to GH therapy because after their physical growth has stabilized, they might lose interest in continuing treatment (30, 31). Programs for psychosocial support and counseling are crucial for controlling expectations and guaranteeing these patients a more seamless transition (32). Research shows that GH replacement therapy raises mood, lessens anxiety and depressive symptoms, and improves general quality of life (QoL) (33). There is a wide range in the degree of improvement, though with some patients reporting significant advantages and others only slight adjustments. A person's response to GH therapy depends on several variables, including their pre-treatment duration adherence to treatment and baseline health status (34). There are concerns regarding the long-term psychological effects of GH therapy because long-term research indicates that although there may be significant initial gains in well-being, these advantages eventually tend to level out (35).

The effects of GH therapy on QoL both physiologically and metabolically

In both pediatric and adult patients GH therapy offers notable physiological advantages that enhance quality of life. Treatment with GH increases muscle strength, bone mineral density, and linear growth in children (36, 37). More physical activity participation is made possible by these modifications, which enhances general health and well-being. By maximizing insulin sensitivity and lipid metabolism, GH therapy also promotes normal metabolic function and lowers the chance of metabolic disorders in later life (38). Despite these advantages, certain kids suffer from adverse effects like headaches or joint pain, which could affect how happy they are with their care overall (39). GH therapy is essential for reestablishing metabolic balance, decreasing visceral fat accumulation, and enhancing cardiovascular health in adults with GHD (40, 41). Research has indicated that GH replacement improves physical performance, energy levels, and muscle function, enabling patients to get more involved in everyday activities. Because they lower the risk of osteoporosis and cardiovascular disease, improvements in lipid profiles and bone density also enhance general well-being (42). The benefits of GH therapy vary from patient to patient, though, and the response may wane with time. A plateau in physical improvements may result from the body adapting to GH treatment, according to some studies (43). This underscores the necessity of customized dosing plans and regular evaluations of treatment effectiveness (44). The disparity in assessment methods is a major obstacle to assessing how GH therapy affects quality of life. Though they might not fully capture the unique difficulties faced by GHD patients, generic QoL assessment instruments like the SF-36 offer general insights into health status (45). The QoL-AGHDA and other disease-specific measures are more

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sensitive to symptoms of GHD, such as emotional distress, cognitive decline, and exhaustion (46). It is challenging to create a standardized assessment framework for the effects of GH therapy on quality of life because variations in study design, patient demographics, and treatment durations make direct comparisons across studies challenging (47).

Side effects, adherence issues, and financial considerations

Adherence to GH therapy is one of the most important factors affecting QoL outcomes in patients with GHD. Daily or weekly injections are necessary for GH replacement, which can be difficult for patients to continue for extended periods. Because of injection fatigue inconvenience and the belief that stopping treatment won't have any negative effects right away, adolescents making the transition to adult care frequently have trouble adhering to their treatment plans (48). Adherence problems in adult patients are frequently associated with worries about money, anxiety about long-term side effects, and doubts about the ongoing need for treatment (49, 50). Maximizing the advantages of GH therapy requires adherence-boosting tactics like patient education support groups and streamlined dosage schedules (51, 52). Although GH therapy is usually well tolerated, some patients have negative side effects such as insulin resistance, joint pain, fluid retention, and an elevated risk of type 2 diabetes or glucose intolerance (53). Despite being generally minor, these side effects can affect a patient's level of satisfaction and willingness to stick with their treatment. Concerns regarding the long-term safety of GH therapy are also still present, especially in light of its possible association with an increased risk of cancer (54). Even though there is currently little evidence linking GH treatment to cancer, long-term surveillance studies are required to fully evaluate its safety profile. Another significant factor influencing QoL is the cost of GH therapy, especially for adult patients who might not have insurance that covers treatment (55). The cost of GH replacement therapy is high, and different healthcare systems have very different treatment availability (56). Financial limitations in some areas keep patients from getting the best care possible, which results in differences in the accessibility and effectiveness of treatments (57). Improving treatment accessibility and guaranteeing that more patients benefit from therapy may be achieved by addressing these financial issues through policy modifications, increased insurance coverage, and the creation of more reasonably priced biosimilar GH formulations (58, 59). Although GH therapy has the potential to greatly enhance the quality of life for patients with GHD, its efficacy is impacted by a complex interaction of physiological, psychological, and socioeconomic factors. Some patients may encounter difficulties with treatment adherence, long-term sustainability of benefits, side effects, and financial burden, while many patients see notable improvements in their physical health, emotional stability, and social integration. To improve patient satisfaction and long-term results, future research should concentrate on customized treatment plans, enhanced QoL assessment techniques, and alternate delivery methods. Optimizing GH therapy and enhancing the general well-being of people with GHD require an understanding of these factors.

Conclusion

For those with GHD, growth hormone replacement therapy has demonstrated significant promise in enhancing their QoL. Patients frequently report having more energy, feeling more stable emotionally, performing better physically, and feeling more confident in social situations. Despite these encouraging results, the variation in each respondent's response emphasizes how crucial individualized approaches are to treatment planning and monitoring. GH therapy needs more research in several areas to increase its efficacy. More recent research should examine their validity and sensitivity to ensure that the current QoL assessment instruments appropriately capture the lived experiences of GHD patients. To reduce possible risks, further research into the safety profile and long-term side effects of GH treatment is also required. Improved techniques for tracking therapeutic progress should also be the main focus of research to make sure patients are getting the most out of their care. Future care can be more

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individualized by filling in these gaps, which will ultimately improve the general health and well-being of people with GHD.

Disclosures

Author contributions

The authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Ethics statement

Not applicable.

Conflict of interest

The authors declare no competing interest.

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