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Review Article

A Review Article On Growth Hormone Deficiency

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ABSTRACT

Growth hormone (GH) deficiency is common in people with problems related to the hypothalamus or pituitary gland, especially if these issues develop early in life. In adults, a lack of GH can lead to increased body fat, heart issues, and a lower quality of life. Since recombinant human GH therapy became available over 25 years ago, numerous studies have shown that it effectively helps adults with low GH levels from pituitary disorders. This treatment can significantly improve symptoms and is considered safe. There's increasing recognition of GH deficiency in adults, leading to a better understanding of how various factors affect treatment success. It's important to also address other hormone deficiencies and manage conditions like pituitary tumours.

INTRODUCTION

Growth hormone deficiency (GHD) is a condition where the body doesn't produce enough growth hormone (GH). Growth hormone (GH) is crucial for growth and development, particularly in childhood and adolescence, as it supports the growth of bones, muscles, and organs. GH deficiency can cause short stature, delayed puberty, and weakened muscles, while GH therapy can enhance growth rates, bone density, and muscle strength. In children, the main symptom is shorter stature, while newborns may have low blood sugar. Adults with GHD can experience reduced muscle mass, high cholesterol, and poor bone density. GHD can be congenital or develop later due to factors like genetics, trauma, or

tumours. The underlying issue often involves the pituitary gland, and sometimes other hormone deficiencies are present as well. Diagnosis is made through blood tests, and treatment typically involves synthetic GH replacement. Although the prevalence of GHD is uncertain, genetic forms affect about 1 in 7,000 people, with males being diagnosed more frequently. GH is crucial not just for growth in children but also for adult health, influencing metabolism and psychological well-being.

Causes:

Growth hormone deficiency in childhood commonly has no identifiable cause (idiopathic), and adult onset GHD is commonly due to pituitary

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tumours and their treatment or to cranial irradiation.[9] A more complete list of causes includes:

1. Genetics:

Some people inherit genes that lead to lower production of growth hormone.

2. Pituitary Issues:

Problems with the pituitary gland, which produces GH, can result in deficiency. This can include tumours, trauma, or damage from infections.

3. Infections:

Certain infections can affect the pituitary gland or the surrounding areas, leading to reduced hormone production.

4. Radiation Therapy:

Treatment for tumours, especially in the brain, can damage the pituitary gland and affect hormone levels.

5. Unknown Causes:

In some cases, doctors can't identify a clear cause for GHD.

6. Congenital Factors:

Some children are born with conditions that affect hormone production, such as Turner syndrome or Prader-Willi syndrome.

7. Genetic Mutations:

Specific mutations in genes related to growth hormone production, like GH1 or GHRHR, can lead to deficiencies.

8. Pituitary Disorders:

Conditions like pituitary adenomas (noncancerous tumours) can disrupt hormone secretion. Damage from surgery or radiation intended to treat these tumours can also be a factor.

9. Head Injuries:

Trauma to the head can impact the pituitary gland, affecting its ability to produce growth hormone.

10. Autoimmune Conditions:

Rarely, the body's immune system can mistakenly attack the pituitary gland, leading to a deficiency.

11. Chronic Illnesses:

Long-term illnesses, particularly those affecting the kidneys or lungs, can also impact growth hormone levels.

12. Hormonal Imbalances:

Deficiencies in other hormones, such as thyroid hormones or adrenal hormones, can sometimes affect growth hormone production.

TYPE OF GROWTH HORMONE:

Growth hormones are of two types:

Somatropin Hormones and Somatotropin Hormones.

Somatropin Hormone:

It is a type of growth hormone in the human body that is essential for the growth of muscles and bones. It is produced in synthesized form by utilizing the recombinant DNA form. Somatropin is useful in curing growth failure in children and people with a lack of growth hormones in their bodies. It is also used for several other medicinal purposes.

Somatotropin Hormone:

Somatotropin is another name for growth hormones. It is a peptide hormone synthesized by the lobe anterior pituitary gland. It boosts the physical growth of the organism. Somatotropin hormone is also present in animals too.

Functions of Growth Hormones

Growth hormones are responsible for the overall body growth of the organism. The various functions of growth hormones are as follows:

- It maintains, builds, and repairs muscles and tissues.
- It helps in body growth and metabolism.
- Growth hormones also help to maintain and repair brain tissues and other body organs.
- It helps to stimulate protein and breaks down body fats, converting them into energy.
- These hormones are also helpful in building bone density.



- Growth hormones are also used as medicinal supplements to overcome the lack of natural growth hormones and other body disorders.

Symptoms:

In Children:

1. Short Stature:

Children with GHD often grow more slowly than their peers, resulting in shorter height for their age.

2. Delayed Growth Milestones:

They might take longer to reach key growth milestones, such as sitting up or walking.

3. Younger Appearance:

Children may look younger than their age due to slower growth and development.

4. Increased Body Fat:

Some children might have a higher percentage of body fat, especially around the abdomen.

In Adults:

1. Reduced Muscle Mass:

Adults with GHD may notice they have less muscle strength and mass.

2. Increased Fat:

There may be an increase in body fat, particularly around the waist.

3. Low Energy Levels:

Adults often experience fatigue or low energy.

4. Decreased Bone Density:

This can lead to weaker bones, increasing the risk of fractures.

5. Mood Changes:

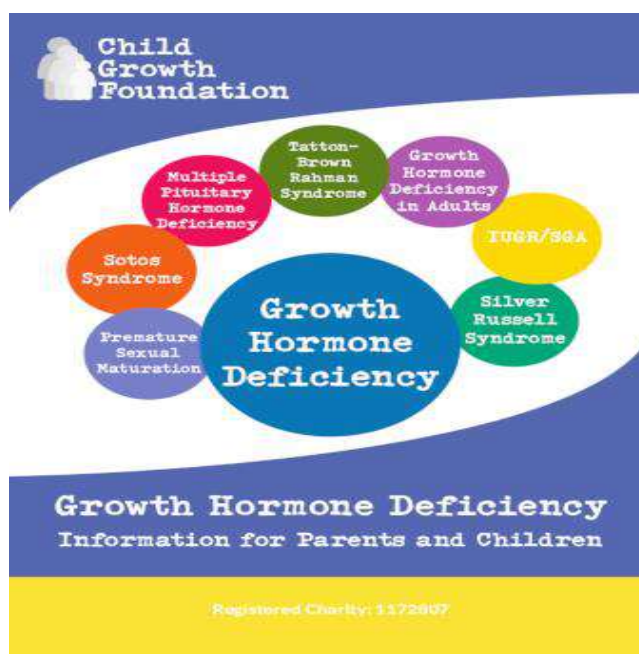
Some individuals might feel depressed or anxious and may have difficulty concentrating.

Congenital Causes:

- ❖ Genetic
 - ❖ Isolated GH deficiency
 1. Type I: Autosomal recessive
 2. Type II: Autosomal dominant
 3. Type III: X-linked recessive
 - ❖ Multiple pituitary deficiencies
 1. Type I: Autosomal recessive
 2. Type II: X-linked
 - ❖ Idiopathic GHRH deficiency
- ❖ Developmental defects
 - Pituitary aplasia
 - Pituitary hypoplasia
 - Anencephaly
 - Midfacial anomalies

6. Poor Quality of Life:

Overall, adults may feel less satisfied with their life and experience a decline in overall well-being.



Long-Term Outcomes:

In Children:

1. Growth and Development:

If untreated, children with GHD may remain shorter than their peers throughout their lives, which can affect self-esteem and social interactions.

2. Bone Health:

They may have lower bone density, increasing the risk of fractures and osteoporosis later in life.

3. Metabolic Issues:

Long-term GHD can lead to problems with body composition, including increased body fat and decreased muscle mass.

In Adults:

1. Physical Health:

Adults with untreated GHD often face metabolic issues, such as obesity and insulin resistance, which can increase the risk of diabetes and cardiovascular diseases.

2. Bone Density:

Similar to children.

CONCLUSION:

Growth hormone replacement therapy is a proven, safe, and effective treatment for adults with GH deficiency. It significantly improves various health aspects, including body composition, bone

strength, heart health, and overall quality of life. Proper diagnosis and personalized treatment plans are essential to maximize benefits and minimize any potential risks. If you suspect you have a GH deficiency, consult with a healthcare professional to explore whether GH replacement therapy is right for you.

REFERENCE:

1. Tomlinson JW, Holden N, Hills RK, Wheatley K, Clayton RN, Bates AS, et al. Association between premature mortality and hypopituitarism. West Midlands Prospective Hypopituitary Study Group. *Lancet*. 2001;357:425–31.
2. Gudmundur Johannsson^{1,2} & Oskar Ragnarsson^{1,2} From the ¹Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden and ²Department of Endocrinology
3. 3. Adult growth hormone deficiency, Vishal Gupta Department of Endocrinology, Jaslok Hospital and Research Centre, Mumbai, India
4. Genetic and Rare Diseases Information Center (GARD) – an NCATS Program. 2016. Retrieved 12 December 2017.



5. NORD (National Organization for Rare Disorders). 2016. Retrieved 12 December 2017.
6. Genetics Home Reference. February 2012. Retrieved 12 December 2017. Genetics Home Reference. August 2010. Retrieved 13 December 2017
7. August GP, Lippe BM, Blethen L, Rosenfeld RG, Seelig SA, Johanson AJ, Compton PG, Frane JW, McClellan BH, Sherman BM 1990 Growth hormone treatment in the United States: demographic and diagnostic features of 2331 children. *J Pediatr* 116: 899–903
8. Rosen T, Bengtsson BA 1990 Premature mortality due to cardiovascular disease in hypopituitarism. *Lancet* 336:285–288
9. Toogood AA, Beardwell CG, Shalet SM 1994 The severity of growth hormone deficiency in adult pituitary disease is related to the degree of hypopituitarism. *Clin Endocrinol (Oxf)* 41:511–516

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