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Opinion

Diagnosis of Growth Hormone Deficiency: Ethical Aspects

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Summary

The diagnosis of Growth Hormone (GH) deficiency involves measuring the concentration of this hormone at baseline and after stimuli. However, the greatest use of the hormone occurs in situations where the concentration of the hormone is normal and does not need to be measured.

The administration of growth hormone stimulants to measure it includes potentially harmful compounds and is contrary to the basic principle of bioethics of "Do no harm" when we have other parameters that together, without injuring the child, suggest that there is a deficit of the hormone so we consider these stimulus tests should be avoided.

Keywords: Growth Hormone; Diagnosis; Stimulation tests; Bioethics.

Introduction

Growth hormone was initially obtained from pituitary extract of cadavers, but the onset of Creutzfeldt-Jacob syndrome stopped this pathway and gave way to genetically engineered GH [1-5].

GH was initially manufactured for those deficient, but its availability favored its trial in other pathologies that occur with alterations in height (Table 1) [6-10].

The diagnosis of GH deficiency involves 4 major criteria: 1) clinical 2) Auxological 3) Images 4) Biochemical tests (Table 2) [11-14].

Clinical data on GH deficiency: short stature; neonates: traumatic delivery, hypoglycemia, prolonged jaundice, and micro phallus; consanguinity and/or affected relatives; skull trauma; history of irradiation in skull; CNS infection; medium craniofacial abnormalities, and signs of multiple pituitary insufficiency.

Auxological criteria for GH deficiency: short stature (height >2 SD below population average), severe short stature (height >3 SD below the population average), height >1.5 SD below the average height of parents, height >2SD below average and height speed more than 1 year >1SD below parental average for chronological age or decrease in SD height >0.5 in a year in children >2 years. In the absence of short stature, a height velocity >2SD below the average for 1 year or >1.5 SD sustained for more than 2 years.

Imaging criteria for GH deficiency diagnosis: delayed bone age, pituitary agenesis, empty Turkish chair, pituitary or suprasellar mass, ectopic pituitary, and calcifications.

Biochemical criteria for GH deficiency: tests used for diagnostic GH concentration, exercise, arginine, insulin, ornithine, clonidine, propranolol, glucagon, L-Dopa, GHRH, priming with sex steroids, and pyridostigmine. Optional or unnecessary tests in: evident clinical GH deficiency, short stature + pituitary hormone deficiency, surgeries or hypothalamic-pituitary irradiation, Eutrophic + hypoglycemia + clinical GH deficiency + low serum growth factors, Turner syndrome, CRI, PWS syndrome, and SGA.

The tests have several limitations: (1) They are not physiological (2) Secretagogue stimulatory power varies. (3) The response is influenced by age, sex, pubertal stage. (4) The reproducibility of the result varies in the same patient. (5) All have important side effects. (6) The normal range of response in very wide and normal concentrations have not been established. (7) The set cut-off point of 10 ug/L is arbitrary [15-17].

Table 1: Indications Approved by FDA Y/0 EMA for GH use.

1	GH deficiency (Since 1985)
2	Chronic kidney disease (Since 1993)
3	Adult GH deficiency (Since 1996)
4	Children an adult with HIV/AIDS wasting and cachexia (Since 1996)
5	Turner syndrome (Since 1997)
6	Prader-Willi syndrome (Since 2000)
7	Small for gestational age (Since 2001)
8	Idiopathic short stature (Since 2003)
9	Short bowel syndrome (Since 2003)
10	Gen SHOX deficiency (Since 2006)
11	Noonan syndrome (Since 2007)

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Table 2: Diagnostic criteria for GH deficiency.

Clinical	Auxological
Images	Biochemical Tests

Subjecting a healthy patient to an invasive procedure and applying drugs with significant adverse effects to obtain a result whose limits of definition are arbitrary goes against the basic principle of "do no harm" of bioethics so we consider stimulus tests unnecessary to measure GH when through the clinical history, physical examination, auxological criteria and imaging we are in position to decide whether or not to administer GH [18,19].

Author Statement

Disclosure Statement

I hereby certify that, to the best of my knowledge, no aspect of my current personal or professional circumstance places me in the position of having a conflict of interest with this article.

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