Growth hormone therapy in children: predictive factors and short-term and long-term response criteria

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Introduction

Growth hormone deficiency (GHD) is the most frequent endocrinological disorder in children with short stature. However the correct diagnosis of growth hormone deficiency (GHD) and the definition of growth response in the management of growth hormone (GH)-treated children is still controversial.

Objectives

The aim of the study is to evaluate the short-term and long-term efficacy of GH treatment in our population and to assess various criteria commonly used to define poor response to GH therapy comparing them in the same cohort of short children with GHD.

Methods

Our population includes 94 children (66 boys and 28 girls), affected by GHD and treated with rhGH until they reached final or near-final height (median age at the beginning of treatment 11.72+3.02 years; medium GHrH dose 0.186 mg/kg/week).

Parameter assessed

-auxological data : height (Ht), height velocity (HV), height relative to midparental height (ΔMPH), gain in height (ΔHt)

- laboratory data: IGF1

- radiological data: hand-wrist X-ray for assessing bone age

-recorded at the start, at 1 year, at 2 years and at the end of GH therapy.

GH stimulation tests results, brain MRI, chronological age and pubertal stage were also analyzed.

The criteria used for detecting poor responders after the first year were:

- Bang-Savage criterion (ΔHt SDS < 0.5)
- Ranke criterion (ΔHt SDS < 0.3 in less-severe GHD or < 0.4 SDS in severe GHD)
- Bakker criterion (HV mean <–1 SDS)

The **final height** was considered satisfactory according to Cianfarani et al. (final ΔHt ≥ 1 SDS).

Results

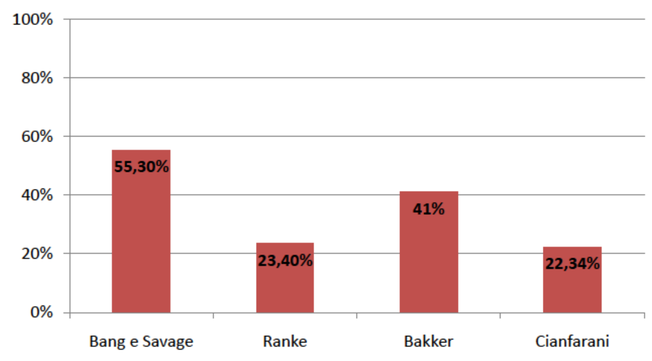
Auxological parameters improved in all patients, except for 10 cases in the first year (10%)and 2 in the second year (2%), for whom we recorded a decrease in Ht SDS. Median height after one year of treatment was –1.99 SDS (range from –3.67 to -0.91 SDS), equal to +0.49 0.36 SDS from baseline values. Mean HV increased too, from +4.37 2.56 cm/year (–1.91 0.18 SDS) to +8.13 1.96 cm/year (+2.33 0.18 SDS). IGF1 levels reached the 75 percentile.

The median final height was - 1.11 SDS, with an height gain of +1.5 0.6 SDS.

	Baseline	1st year	2nd year	Final Height
Ht SDS	-2.56 [-3.76 to -1.27]	-1.99 [-3.67 to -0.91]	-1.57 [-3.14 to -0.22]	-1.11 [-2.68 to +1.26]
HV cm/yr	4.37 (2.56)	8.13 (1.96)	7.59 (1.95)	/
HV SDS	- 1.91 (0.18)	+2.33 (0.18)	+3.64 (0.24)	/
Δ Ht SDS	/	+ 0.49 (0.36)	+ 0.42 (0.29)	+ 1.5 (0.6)
Δ MPH SDS	-1.68 (0.89)	-1.19 (0.87)	-0.79 (0.83)	-0.17 (0.81)
IGF1 p.le	25 [3 to 75]	75 [10 to 97]	75 [10 to 97]	50 [3 to 97]

After one year of treatment we could define “poor responders” 52/94 patients (55.3%) according to Bang e Savage criterion, 25/61 (40.9%) according to Bakker criterion and 22/94 (23.4%) according Ranke criterion. At the end of the treatment, poor responders according to Cianfarani were 21/94, equal to 22.34%.

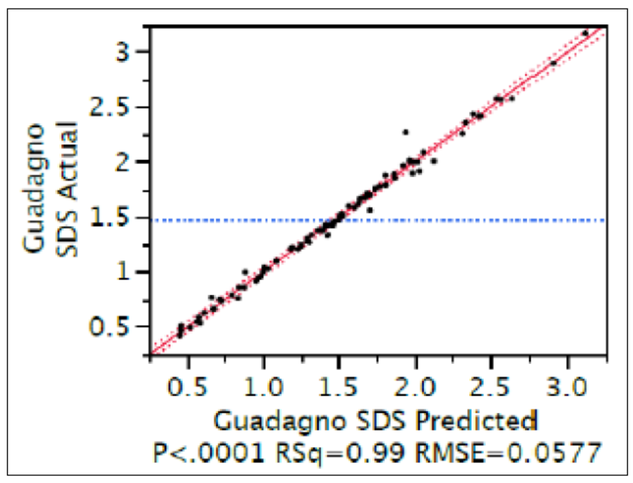
By the way 97.9% of the population achieved midparental target height.



Our analysis revealed a significant negative association between height gain (after 1 year and at the end of treatment) and chronological age at diagnosis (p = 0.0004).

In addition we identify a statistically significant positive correlation between final ΔHt and duration of therapy (p = 0.0004).

No correlations were found between height gain and GH peaks after stimuli (p=0.1711).



Conclusions

Our data confirm the short -term and long-term efficacy of GH treatment in GHD.

We show that starting sostitutive therapy as soon as possibile can optimize the efficacy of treatment according to a lower chronological age at the diagnosis and a longer duration of therapy.

We underline the lacking of specific criteria to define a satisfactory growth response after replacement therapy; for this reason we suggest to evaluate every patient in his personal and family history, especially referring to midparental height .

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Fat 2

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