Evaluation of Diagnosis, Follow-up and Treatment Results of Growth Hormone in Rare Diseases; 10 Year Single Center Experience

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Introduction

Growth hormone therapy (GHT); have been used in rare diseases such as growth hormone deficiency (GHD), panhipopituitarism (PHP), intrauterine growth retardation (IUGR), Turner Syndrome(TS) for many years while the effects of diagnostic timing on the treatment results are known (1-3). However, data on the diagnosis and treatment processes of these diseases are limited in our country. The aim of this study was to evaluate the results of diagnosis, follow-up and treatment of the patients who were started GHT for the last 10 years and to determine the differences in the process and results over the years.

Material and Methods

857patients who underwent GHT between 2009-2018 were evaluated retrospectively in all patients and subgroups(GHD, PHP, IUGR, TS) in terms of GHT onset time, follow-up, GHT offset time, anthropometric, clinical, laboratory data, treatment adherence and side effects

Results

GHT was started in 695 cases (81.1%) with GHD, 24 (2.8%) with PHP, 26 (3%) with IUGR and 28 (3.3%) with TS. The median age of onset of GHT was 12.2 years and the earliest was on IUGR (8.6 years) on the other hand, it was at the latest on GHD (12.3 years).

The pituitary MRI was pathological in 26% of the patients and the most common was pituitary hypoplasia. The median follow-up period was 11 months and 2 years. Treatment noncompliance was found to be 9% in this study.

In 17% of patients, treatment was interrupted due to adjustment problem, low growth rate and IGF1 increase. Side effects were seen in 3% of the patients (significant elevated CK, scoliosis, cardiac causes).

The height SD of the patients in the GHD group at the beginning of treatment was - 3SD, while the treatment termination period was -1,9SD, and in the final-1,5SD ($p < 0,05$). At the time of treatment offset, height SDS in GHD and PHP were significantly higher than treatment onset time, whereas there was no significant difference in TS and IUGR (Table-1).

218 cases reached the final height. Final lengths in boys/girls were respectively in GHD:153/164,1cm PHP:155,6/162,7cm; TS:147,2cm (133 to 156.4); IUGR:144.6 (136.7 to 150.3), respectively. Of the 166 GHD patients who reached their final height,104 (67.5%) were found to reach their target height

Conclusion

In this study, 81.1% of 857 patients who had undergone GHT were treated with the diagnosis of GHD, no difference was observed in the last 10 years between the age of presentation and treatment of the patients and the treatment was started late. The patients' compliance with treatment was high (91%) and the incidence of side effects was low(3%). Approximately 68% of 166 BHE cases reached the target height.

Considering the findings of our study, it was concluded that due to short stature in our country, age at admission and onset of GHT were late and there is a need for more studies on this subject.

References:

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3-Abalı, Zehra Yavaş, Feyza Darendeliler, and Olcay Neyzi. "A critical appraisal of growth hormone therapy in growth hormone deficiency and Turner syndrome patients in Turkey." *Journal of clinical research in pediatric endocrinology* 8.4 (2016): 490.

Table-1 Antropometric and Clinical Findings of Patients at the Time of Admission, Treatment Onset and Treatment Offset

Whole Geoup (n: 857)	Admission Median (Min.Max)	GHT onset time Median(Min.Max.)	GHT offset time Median (Min-Max.) (n:563)	p
Age (Year)	11,11 (0-17)	12,2 (0,83-17,3)	15,1 (2,9-21)	-
Bone age (year)	8,1 (0-15)	10 (0,5-15)	14 (1-17)	-
Birth weight (gr)	3000 (500-6000)	-	-	-
Height SD	-2,9 (-8,46-1,79) bc	-3,05 (-8,46--1,65) ac	-2,02 (-8,6-0,97) ab	<0,001*
BMI SD	-0,9 (-5,5-4) b	-0,99 (-6,3-3,62) ac	0,81 (-10,18-4,2) b	0,012*
Puberty	1 (1-5)	-	4(1-5)	
Follow-up period (year)	-	0,9 (0-15)	2,1 (0-10,8)	-
GHD (n:695)	**Admission Median (Min.Max)**	**GHT onset time Median (Min.Max.)**	**GHT offset time Median (Min Max.) (n::457)**	**p**
Age (Year)	11,4 (0,63-17)	12,3 (0,83-17,3)	15,1 (2,9-19	-
Bone age (year)	8,1 (0-15)	10 (0,75-15)	14 (1-17)	-
Birth weight (gr)	3000 (500-6000)			
Height SD	-2,81 (-8,46--0,15) bc	-3 (-8,46--1,65) ac	-1,96 (-8,6-0,97) ab	<0,001*
BMI SD	-0,9 (-4,3-3,5) b	-1 (-6,3-3,62) ac	-0,83 (-10,18-4,2) b	0,011*
Puberty	1 (1-5)	-	4 (1-5)	-
Follow-up period (year)	-	0,9 (0-15)	2 (0-10,8)	-
Panhipopitutiarizm (n:24)	**Admission Median (Min.Max)**	**GHT onset time Median (Min.Max.)**	**GHT offset time Median (Min-Max.) (n:15)**	**p**
Age (Year)	7,2 (0-14,9)	9,9 (1,8-17)	16,3 (3,8-21	-
Bone age (year)	5 (1-11)	6 (2,9-13,5)	14 (7-17)	-
Birth weight (gr)	3100 (950-4130)	-	-	-
Height SD	-3,5 (-5,98--0,97) bc	-3,84 (-6,08--2,18) ac	-1,69 (-6,3--0,24) ab	0,007*
BMI SD	-0,2 (-2,4-1,9)	-0,52 (-2,39-1,91)	-0,16 (-3,38-1,54)	0,207
Pubety	1 (1-2)	-	3 (1-5)	-
Follow-up period (year)	-	1,5 (0,04-6,8)	3,8 (0,3-9)	-
IUGR (n: 26)	**Admission Median (Min.Max)**	**GHT onset time Median (Min.Max.)**	**GHT offset time Median (Min-Max.) (n:15)**	**p**
Age (Year)	7,51 (0,19-13,1)	8,65 (3,01-14,4)	13,45 (5,1-17,3)	-
Bone age (year)	4,3 (1,6-11)	6 (1,0-12	13,6 (3-16)	-
Birth weight (gr)	1950 (900-2600)	-	-	-
Height SD	-3,87 (-5,81--2,6)	-3,6 (-5,87--2,49)	-2,95 (-7,2--1,9)	0,097
BMI SD	-0,9 (-3,7-4)	-1,67 (-2,64-0,97)	-1,21 (-3,08-1,82)	0,205
Puberty	1 (1-3)	-	2 (1-5)	-
Follow-up period (year)	-	1,6 (0,8-5,3)	2,7 (0,5-8,3)	-
Turner Syndrome (n:28)	**Admission Median(Min.Max)**	**GHT onset time Median (Min.Max.)**	**GHT offset time Median (Min-Max.) (n:14)**	**p**
Age (Year)	9,4 (0-13,6)	11,11 (7-13,8)	14,6 (7,3-17)	-
Bone age (year)	7,6 (0,5-13)	8,1 (5-13)	13,5 (10-15)	-
Birth weight (gr)	2900 (1300-3750)	-	-	-
Height SD	-3,42 (-4,33-1,79)	-3,5 (-4,33--1,95)	-2,85 (-5,2--1,15)	0,225
BMI SD	0,7 (-5,5-1,7)	0,75 (-1,22-1,9)	0,4 (-1,16-2,41)	0,814
Puberty	1 (1-2)	-	4 (1-5)	-
Follow-up period (year)	-	0,5 (0,025-11)	2,8 (0,3-6,3)	-
Others (n:84)	**Admission Median (Min.Max)**	**GHT onset time Median(Min.Max.)**	**GHT offset time Median (Min-Max.) (n:60)**	**p**
Age (Year)	9,25 (0,5-15,6)	12,5 (1,7-16,4)	15,01 (2,9-19)	-
Bone age (year)	6,5 (0,5-13,6)	9 (0,5-13,6)	13,6 (1,5-17)	-
Birth weight (gr)	3100 (900-4300)	-	-	
Height SD	-2,99 (-6,06--1,45)) bc	-3,27 (-7,42--2,3) ac	-2,5 (-6,1--0,89) ab	<0,001*
BMI SD	-0,9 (-2,6-1,8)	-1,09 (-5,55-1,6)	-1,09 (-3,76-1,18)	0,103
Puberty	1 (1-4)	-	4 (1-5)	-
Follow-up period (year)	-	1,5 (0,1-6,3)	2,5 (0,3-7,5)	-

a)Different form admmission time b) Differnt from GHT onset-time c)Differnt from GHT offset-time