Growth, Development, Puberty and Adult height of patients with Multiple Pituitary Hormone Deficiency

H. Haim-Pinhas, med student, R. Kauli, MD, P. Lilos, B.Fc, Z. Laron, MD
Endocrinology and Diabetes Research Unit, Schneider Children’s Medical Center, Petah-Tikva, Sackler Faculty of Medicine, Tel-Aviv University, Israel

Introduction

In most publications no differentiation is made between patients with congenital MPHD and acquired MPHD.

Aim of study

To evaluate the effects on growth and development in 29 patients with congenital MPHD (cMPHD), during hGH replacement therapy alone and combined with sex hormones.

Subjects

Twenty nine patients (14 males, 15 females) with cMPHD were followed from early childhood until end of puberty. The majority of patients originate from the Middle East. 15 patients belong to consanguineous families.

Results

Birth and early development

The mean birth weight of full term neonates was 3292 ± 510 g (m), 2949 ± 461 g (f).

Mean birth length in 7 full term neonates was 50.5 ± 0.7 cm (m), 48.3 ± 0.6 cm (f).

Head circumference (HC)

Mean HC (SD) before treatment was -1.9 ± 0.9. During hGH treatment the HC increased to -1.5 ± 1.3, and to -0.6 ± 1.8 during hGH+sex hormone treatment (p<0.001).

Puberty

Testicular volume in 9 males were smaller than normal before treatment, with a mean volume (±SD) of 1.2 ± 0.2 ml. Testicular volume at end of hGH treatment was 2.2 ± 2.2 ml (p=0.21), denoting the absence of sex hormone.

Both GH but mainly sex hormone treatment increased penile size. The mean ±SD penile length at end of puberty was 10.7 ± 1.9 cm.

Chronological age/bone age (CA/BA) ratio

(CA/BA) ratio increased from 1.6 ± 0.4 before treatment to 1.4 ± 0.3 after hGH treatment, and to 1.3 ± 0.2 during hGH+sex hormone treatment (p<0.001), more evident in males (Figure 1).

Final height

The response to GH without and in combination with sex hormones is summarized in Table 1.

Eighteen patients (10 males,8 females) reached normal heights ranging between the 3rd to 45th centiles.

There was a negative correlation between age at referral and adult height SDS in females (r = -0.552, p = 0.05) and between age at initiation of hGH treatment and adult height SDS in the males (r = -0.525, p = 0.065). In both males and females there was a positive correlation between height SDS at initiation of sex hormone treatment and the adult height SDS (r = 0.765, p < 0.001).

Adipose tissue

We found a positive correlation between duration of treatment to the subscapular skinfold thickness (SSS) during of hGH treatment (r=0.71, p=0.014) (Figure 2).


duration of hGH treatment (years)

<table>
<thead>
<tr>
<th>duration of hGH treatment (years)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>M ± SD</td>
<td>6.7 ± 3.5</td>
<td>6.8 ± 4.2</td>
<td>6.8 ± 4.5</td>
<td>6.8 ± 4.8</td>
</tr>
<tr>
<td>F ± SD</td>
<td>6.7 ± 3.5</td>
<td>6.8 ± 4.2</td>
<td>6.8 ± 4.5</td>
<td>6.8 ± 4.8</td>
</tr>
<tr>
<td>P value</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Conclusion

Early diagnosis and treatment of cMPHD and late induction of puberty enables normal or near normal adult height.

References