Evaluating First Year Response and Final Height to Growth Hormone Treatment in Growth Hormone Deficiency based on Peak GH levels on Testing

Saygin Abali, Serpil Baş, Azad Akbarzade, Zeynep Atay, Belma Haliloğlu, Tülay Güran, Serap Turan, Abdullah Bereket
Marmara University, Department of Pediatric Endocrinology and Diabetes, Istanbul, Turkey

**Background**

Diagnosis of GH deficiency (GHD) is a complicated issue especially in isolated GH deficiency. Auxological evaluation, IGF-I, IGFBP-3 levels and GH response to provocative testing are all considered in the diagnosis. However, cut-off values for GH levels at stimulation tests are controversial.

**Objective**

We aimed to evaluate the response to rhGH treatment in patients with different GH peak levels in stimulation test

**Method**

Retrospective study

**Inclusion criteria**
- Growth hormone deficiency
- Followed for minimum of 1-year with rhGH therapy

**Exclusion criteria**
- GH peak levels >10 ng/dl in stimulation test
- Chronic illness
- Turner syndrome

**Table 1. Features of patients at initiation of rhGH treatment and at first year**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Group 1 (n=68)</th>
<th>Group 2 (n=81)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girl n (%)</td>
<td>28 (41.2)</td>
<td>32 (39.5)</td>
<td>0.836</td>
</tr>
<tr>
<td>SGA n (%)</td>
<td>4 (6.7)</td>
<td>13 (19.4)</td>
<td>0.035</td>
</tr>
<tr>
<td>Normal sella MR n (%)</td>
<td>30 (44.1)</td>
<td>62 (83.8)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>MPH SDS, meanSD (median)</td>
<td>-1.0±0.7 (-0.9)</td>
<td>-1.4±0.8 (-1.3)</td>
<td>0.008</td>
</tr>
</tbody>
</table>

**At initiation**

Age (meanSD) 11.3±3.9 11.7±3.1 0.500
Bone age, meanSD 8.1±4.0 9.6±2.9 0.004
Age - Bone age, meanSD 2.8±2.0 2.4±1.6 0.293
Height SDS, meanSD -3.4±1.4 -3.0±0.9 0.034
BMI SDS, meanSD (median) 0.3±1.4 (0.6) -0.5±1.4 (-0.4) 0.002
IGF1 SDS, meanSD -1.5±0.9 -0.9±0.6 <0.001
GH dose (µg/kg/d) 30.0±5.4 34.5±4.9 <0.001

**First year**

Age, meanSD 12.4±3.9 12.8±3.0 0.496
Bone age, meanSD 9.7±3.6 11.0±2.7 0.041
Age - Bone age, meanSD 2.7±1.7 2.1±1.5 0.079
Height SDS, meanSD -2.4±1.1 -2.4±0.8 0.085
BMI SDS, meanSD (median) 0.0±1.1 (0.1) -0.4±1.1 (-0.5) 0.089
First year response (Difference between height SDSs) 1.0±0.7 0.6±0.3 <0.001

**Table 2. Patients with the final/near final height (n=57)**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Group I (n=21)</th>
<th>Group II (n=36)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial height SDS*</td>
<td>-4.0±1.9</td>
<td>-2.9±0.7</td>
</tr>
<tr>
<td>PAH SDS at initiation</td>
<td>-1.7±1.1</td>
<td>-1.2±1.0</td>
</tr>
<tr>
<td>MPH SDS</td>
<td>-1.3±0.7</td>
<td>-1.3±0.8</td>
</tr>
<tr>
<td>Final height (FH) SDS</td>
<td>-1.2±0.7</td>
<td>-1.4±0.8</td>
</tr>
<tr>
<td>FH SDS - Initial HT SDS*</td>
<td>2.7±1.7</td>
<td>1.5±0.7</td>
</tr>
<tr>
<td>FH SDS - MPH SDS</td>
<td>0.2±0.9</td>
<td>0.2±1.0</td>
</tr>
<tr>
<td>FH SDS - PAH SDS*</td>
<td>0.5±1.1</td>
<td>-0.2±1.2</td>
</tr>
</tbody>
</table>

*p<0.001

**Conclusion**

In GHD, patients with peak GH levels under 5 ng/dl had better first year response and final height gain with rhGH treatment.