Growth response to growth hormone therapy in short children in relation to their distance from mid-parental heights (MPHt).

Sohair Elsiddig, Ahmed Khalil, Nada Alaaraj, Hannah Ahmed, Ashraf Soliman
Department of Pediatrics, Hamad General Hospital, Doha, Qatar

Introduction
In normal children, mid parental height (MPH) is a valuable tool in assessing children’s growth and predicting their final adult height. However, this may not be true for short children, especially those with height SD (HtSDS) > 1SDS compared to their mid-parental height SDS (MPHtSDS). The big difference may indicate underlying pathology.

Aim of the study:
To assess growth response (change in HtSDS) to GH therapy in short prepubertal children in relation to their MPHtSDS.

Methods
This retrospective study reviewed 42 prepubertal short children with HtSDS < -2. Children classified based on distance from MPHtSDS in two groups.

- Group 1 included children whose HtSDS were 1SDS or more below their MPHSDS (N=25).
- Group 2 whose HtSDS is less than 1SDS from MPHSDS (N=17).

Their BMISDS, IGF1SDS, bone age and growth velocity (GV), and difference from MPHSDS were measured before and after one year.

Sixteen children in Group 1 and 11 children in group 2 were treated with growth hormone therapy (0.03 - 0.5 mg/kg/d) subcutaneously to keep their IGF1 SD in the normal range (0 to 2 SD).

Results
Children in group 1 had HtSDS - MPHSDS = -1.72±0.52 while in group 2 the difference was -0.33±0.75. (p <0.01).

Children in Group 1 were significantly shorter compared to group 2 (HtSDS (-2.35±0.57) vs. (-1.89±0.61) respectively P=0.02). There was no statistical difference in BMISDS, IGF1SDS, or bone age at presentation.

After a year of GH therapy:
The HtSDS of children in group 1 increased to -2.01±0.59 (P=0.005), and their difference from MPHSDS improved by (0.67±0.85) P<0.0000.

In group 2 the HtSDS increased to -1.66±0.68, (p< 0.01) and their difference from MPHSDS improved by (0.30±0.32) (P=0.01)

Conclusion
In short peripubertal children: GH therapy had significantly increased their HTS canvas and improved the difference between their height and their genetic background (MPHtSDS). Moreover, those with a higher HTS canvas compared to MPHtSDS at the beginning had significantly faster correction towards their genetic potential (significant catch up towards the genetic background).

<table>
<thead>
<tr>
<th>Age</th>
<th>HtSDS1</th>
<th>BMISDS1</th>
<th>HtSDS1-MPHSDS</th>
<th>HtSDS2</th>
<th>BMISDS2</th>
<th>HtSDS2-MPHSDS</th>
<th>Delta HtSDS</th>
<th>Delta BMISDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>10.55</td>
<td>-2.35*</td>
<td>-0.84</td>
<td>-1.72*</td>
<td>-2.01</td>
<td>-0.57</td>
<td>-1.38*</td>
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<td>2.85</td>
<td>0.57</td>
<td>0.94</td>
<td>0.52</td>
<td>0.59</td>
<td>1.11</td>
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<tr>
<td>Group 2</td>
<td>9.48</td>
<td>-1.89</td>
<td>-0.16</td>
<td>-0.33</td>
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<td>-0.09</td>
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<td>0.61</td>
<td>1.17</td>
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<td>0.91</td>
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<td>0.2</td>
</tr>
</tbody>
</table>

Group 1: HtSDS were 1SDS or more below MPHSDS.
Group 2: HtSDS less than 1SDS from MPHSDS.

*P <0.05 between groups
#P <0.05 in the same group