The relation between Changes in Body Mass Index (BMI) and linear growth in prepubertal children: Daily Weight Gain and BMI changes in Relation to Linear Growth During Nutritional Rehabilitation of Underweight Children

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INTRODUCTION

Early detection of abnormal weight loss in childhood may be important for preventive purposes. Variable growth response to nutrition rehabilitation have been reported in children with failure to thrive (FTT) who do not have any chronic disease or due to different clinical and nutritional approach in their management.

Aim:

- To analyze the effect of different BMI and BMI SDS on linear growth (HtSDS).
- To studied the effect of weight changes on linear growth (HtSDS).

METHODS

- Cross sectional, children 1-9 yr. with abnormal Wt.
- Normal physical exam and routine labs (CBC, RF, LFT, ESR, TFT).
- Children with chronic illness excluded.
- Anthropometric data reviewed & based on BMISDS categorized into 4 groups:

<table>
<thead>
<tr>
<th>Group</th>
<th>BMISDS</th>
<th>N</th>
<th>Age (Yr.)</th>
<th>Height SD</th>
<th>BMI SDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>&lt;2</td>
<td>Mean</td>
<td>19</td>
<td>4.97</td>
<td>-1.58</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td></td>
<td>4.4</td>
<td>1.36</td>
</tr>
<tr>
<td>Group 2</td>
<td>&gt;2</td>
<td>Mean</td>
<td>33</td>
<td>5.6</td>
<td>-1.76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td></td>
<td>4.0</td>
<td>0.92</td>
</tr>
<tr>
<td>Group 3</td>
<td>&lt;1</td>
<td>Mean</td>
<td>20</td>
<td>3.1</td>
<td>-1.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td></td>
<td>2.75</td>
<td>0.97</td>
</tr>
<tr>
<td>Group 4</td>
<td>&gt;2</td>
<td>Mean</td>
<td>30</td>
<td>8.97</td>
<td>1.03</td>
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<tr>
<td></td>
<td></td>
<td>SD</td>
<td></td>
<td>3.90</td>
<td>0.97</td>
</tr>
</tbody>
</table>

* = P< 0.05 groups vs controls (Group 3), 
# = P < 0.05 groups vs obese group (Group 4)

RESULTS

- Obese children had the largest HtSDS (-1.03 +/- 0.9) while children with BMISDS (< -1) were significantly shorter (HtSDS = -1.7 +/- 0.9) compared to the other groups.
- 49% treated children with BMISDS (< -1) exceeded average normal Wt. gain for age during nutritional rehabilitation.
- 60% increased BMISDS and 43% increased HtSDS at end of 1 year.
- Linear regression showed a significant correlation between BMISDS and HtSDS supporting the notion that proper nutrition and maintaining normal BMISDS is essential for adequate gain in height.
- Inadequate compliance with NR can explain the failure to achieve the proper weight gain during nutritional rehabilitation.

CONCLUSION

- BMISDS is clinically useful to detect the effect of changes in Wt. on linear growth and monitor nutritional management.
- More intensive interference including hospital admission and/or tube feeding may be required in undernourished children who fail to gain adequate weight during nutritional rehabilitation at home.

Correlation between growth velocity (cm/yr) and weight gain g/day (R=0.4, P=0.02).

Regression analysis of BMI SDS score on Height SDS score (R = 0.723, P < 0.001) (n =470)

Poster presented at:

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DOI: 10.3252/pso.eu.58ESPE.2019

Growth and syndromes (to include Turner syndrome)

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