Children with obesity are taller in early childhood with subsequent catch-down growth until adolescence

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Background & Aim

Childhood obesity is supposed to affect growth and development in children1,2 but there is uncertainty with regards to dynamics and potential causes. We want to decipher when the obesity-related differences in linear growth are developing and which hormonal factors are most closely related to those differences.

Study Design

In the LIFE Child and Leipzig Obesity Childhood Cohort including 35134 data sets from 7961 children we compared cross-sectional and longitudinal anthropometric, parental and endocrine data from birth to adulthood in one-year intervals between normal-weight (NW) and obese (OB) children.

Results

1. Obese children are taller in early childhood

Obese children were up to 7.6 cm (1.4 standard deviation scores (SDS) taller than normal-weight children at ages 6-7 years independently from familial predisposition.

2. Obese children were born with increased birth length

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<thead>
<tr>
<th></th>
<th>NW</th>
<th>OB</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>51.11 ± 2.18</td>
<td>51.38 ± 2.36</td>
<td>0.032</td>
</tr>
<tr>
<td>Girls</td>
<td>50.12 ± 2.08</td>
<td>50.61 ± 2.61</td>
<td>&lt;0.001</td>
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</tbody>
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Obese children were up to 0.5 cm taller at birth than normal-weight children.

3. Growth velocities are altered in obese children

Obese children grew faster at the age of 5 years and slower during puberty. The pubertal growth spurt is almost lacking.

4. Differences in growth velocities coincide with differences in serum levels of IGF-1 and sex hormones

In obese children IGF-1 levels tend to be elevated in early years and are decreased during puberty. Simultaneously with the decrease in growth velocity obese boys present up to 58% reduced testosterone and obese girls up to 43% reduced estrogen levels during puberty.

Conclusion

Dynamics of linear growth and circulating hormone levels in obese children are distinct from those of normal-weight peers. In future studies we aim to investigate the underlying molecular mechanisms of how obesity contributes to changes in serum hormone levels in children and to assess potential risks for sequelae emanating from those hormonal imbalances.

The authors declare they have no conflict of interest.

Literature:
1Holmgren et al., Pediatric research, 2017;
2Shalitin et al., Horm Res Paediatr. 2017

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Poster presented at: