Intrauterine growth restriction, gestational age, steroidal prophylaxis and breastfeeding influence bone mass in prepubertal children

Annalisa Calcagno¹, Giovanna Paia², Anna Elsa Maria Allegri³, Nadia Fratangelo¹, Maria Grazia Calevo², Maghnie Mohamad¹, Natascia Di Iorgi¹

¹University of Genoa, Endocrine Unit, Institute G. Gaslini, Genova, Italy
²Department of Epidemiology, Biostatistics and Ethical Committee, Institute G. Gaslini, Genova, Italy

Introduction and Objectives

Since preterm survival improves:
- the later in life effects of prematurity are becoming relevant
- the impact of prematurity on skeletal health is not yet well elucidated

Aim of our study:
- to evaluate bone mass in ex-preterm (PT) and born at term (BT) prepubertal children and potential risk factors for bone health.
- to analyse its relations with early risk factors

Methods

<table>
<thead>
<tr>
<th>Cases</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children enrolled</td>
<td>100 PT (42F, 58M)</td>
</tr>
<tr>
<td>Age at evaluation (yrs+SD)</td>
<td>6.7±1.3</td>
</tr>
<tr>
<td>Gestational Age (GA) (weeks+SD)</td>
<td>31.5 ± 2.6</td>
</tr>
<tr>
<td>Birth weight (g+SD)</td>
<td>1557±0,543,1</td>
</tr>
<tr>
<td>SGA</td>
<td>6%</td>
</tr>
<tr>
<td>IUGR</td>
<td>21% (n=21)</td>
</tr>
<tr>
<td>Antenatal steroid (AS)</td>
<td>55%</td>
</tr>
<tr>
<td>Breastfeeding</td>
<td>20% (n=20)</td>
</tr>
</tbody>
</table>

Children underwent:
- Anthropometrics
  - height (cm and SDS)
  - weight, BMI (kg/m², SDS), waist, hips
  - head circumference
- Dual X-ray Absorbiometry evaluations (Lunar Prodigy GE) total body (TB) less head and lumbar spine (L) for:
  - Bone Mineral Density (BMD-g/cm², Z-score*)
  - Bone Mineral Content (BMC-g)
  - TB Fat Mass (FM%,kg)
  - Free Fat Mass (FFM-kg)
*normal data handed from the manufacturer

Results and Conclusions

1. There were no significant differences between PT and BT children in anthropometrics, DXA parameters and bone markers.
2. Positive correlations were found between GA or birth weight and BMC, BMD or BMI Z-score both at the TB and the L1-L4.
3. The IUGR group (17.9%) was shorter and had significantly lower DXA bone measures (all P’s < 0.05) compared to no IUGR children (Fig.1).
4. AS was negatively (r’s between -0.16 and -0.39; all P’s<0.04) associated to all bone parameters (Fig.2).
5. Breast feeding was positively (r’s between 0.18 and 0.29; all P’s<0.02) associated to all bone parameters (Fig.3).

Our study demonstrates:
- comparable bone mass parameters in PT and BT prepubertal children
- breastfeeding seems to have a positive impact on bone parameters
- GA, IUGR and AS might represent long-lasting risk factors for bone health

References