Background

- Adults with growth hormone deficiency (GHD) reportedly present with altered body composition characterised by an increase in fat mass, predominantly in the visceral compartment.
- The ratio of visceral to subcutaneous fat, a metric of body fat distribution, is a unique correlate of cardiometabolic risk.
- Magnetic resonance imaging (MRI) offers high precision measurements for visceral fat quantification without the radiation risks of computerised tomography (CT).
- To our knowledge, there have been no detailed MR based investigations into the abdominal fat distribution of the GH deficient state in comparison to matched GH-treated GHD adults and healthy controls.

Aims

- To compare abdominal fat distribution in untreated GHD adults with treated GHD adults and healthy controls.

Methods

- Cross-sectional study.
- 22 untreated GHD, 23 treated GHD & 20 matched healthy controls were recruited.
- All subjects underwent anthropometry and body fat % measurement with a bio-impedance scale.
- MR studies were performed using a 3 Tesla Philips Achieva scanner. Subcutaneous (s.c.) and visceral abdominal fat content was measured by acquiring images at the L4/L5 junction.
- REC approval obtained.
- Statistical tests as described (Minitab v16).

Results

<table>
<thead>
<tr>
<th>Mean ±SD</th>
<th>OFF GH</th>
<th>ON GH</th>
<th>Controls</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total No</td>
<td>22</td>
<td>23</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>27.85±9.34</td>
<td>29.76±10.07</td>
<td>31.05±7.91</td>
<td>0.54</td>
</tr>
<tr>
<td>Sex ratio</td>
<td>59.2% males</td>
<td>60.2% males</td>
<td>60% males</td>
<td></td>
</tr>
</tbody>
</table>

Aetiology of GHD:

- MPHGD / isolated GHD
- Childhood/Adult onset
- CNS Surgery
- Craniotomotherapy
- Chemotherapy

Anthropometry:

- BMI (kg/m²)
- Waist (cm)
- Body fat %
- Activity level (MET min/week)

Metabolic parameters:

- HOMA index
- HbA1c (%)
- Total cholesterol (mmol/L)
- HDL (mmol/L)
- LDL (mmol/L)

Table 1: above shows the subject characteristics including anthropometry and metabolic profiles (ANOVA and post hoc Tukey’s tests undertaken, † indicates median)

Conclusions

- Hypopituitary (both untreated GHD and treated GHD) patients have increased total, subcutaneous and visceral abdominal fat compared to age, sex and physical activity matched healthy controls.
- Untreated GHD adults do not demonstrate altered abdominal fat distribution (VAT/SAT) when compared to treated GHD adults and healthy controls.
- Other factors such as underlying CNS malformation, exposure to radiotherapy and chemotherapy appear to be more important in determining body composition than GH status.

References:
2. Kamo et al: The ratio of visceral to subcutaneous fat, a metric of body fat distribution, is a unique correlate of cardiometabolic risk. Diabetologia 2012

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