Obesity is common at diagnosis of childhood pituitary adenoma, and may persist following successful treatment

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Introduction

- Pituitary adenomas (PA) occur rarely in childhood and adolescence, and account for 3% of all intracranial paediatric neoplasm (1), and between 3 - 6% of all PA (2).
- A number of studies describing paediatric PA have been reported, but typically in small cohorts of patients and including patients age up to 20 years of age at diagnosis (3).
- In adult patients, obesity and an adverse cardiovascular profile are reported commonly.
- To our knowledge, very few data are available reporting long term treatment outcomes in children and young people.

Aim

- To contribute to existing observational data in patients age <16 years at diagnosis of PA.
- To report the prevalence of obesity at diagnosis and following successful treatment.

Study Design

Subjects:
- Retrospective case note review of patients treated within a single, continuous service initially at Alder Hey Children's Hospital with subsequent care in the adult service at University Hospital Aintree and the Walton Centre for Neurology and Neurosurgery (Liverpool, UK).

Methods:
- The following data were collected: Presenting history, physical examination, MRI findings, biochemical assessment of pituitary function and mode of treatment.
- The following data were collected from the most recent review: pituitary hormone deficiencies, medical treatment and body mass index (BMI).
- Results of genetic tests were also recorded.
- Growth hormone deficiency (GHD) in childhood was defined as peak growth hormone (GH) <6.7 mcg/l (Adult-onset GHD: peak GH <3 mcg/l).
- Cortisol deficiency was defined as suboptimal response (<450 nmol/L) to low dose short Synacthen test (LDSST).

Statistical analysis:
- Data were analysed using IBM SPSS 23.0 software. Data are reported as median (range).

Results

- 24 patients were followed for 3.3 (0.6 to 8.4) years.
- 13 patients had prolactinomas.
- 5 patients had Cushing’s Disease.
- 6 patients had non-functioning PA.
- Fourteen patients were obese (BMI SDS >2) at diagnosis and 12 (52%) patients were obese (BMI 3.09 SDS; range: 2.05 to 3.79 SDS) at most recent review.

Clinical data are reported in Table 1.

Figure 1: MRI brain at presentation T1 weighted enhanced by gadolinium. coronal and sagittal views showing a large pituitary macroadenoma (2.1x1.6x2.3 cms).

Table 1: Clinical characteristics of 24 patients with pituitary adenomas

<table>
<thead>
<tr>
<th>Adenoma type</th>
<th>Age (years)</th>
<th>Sex</th>
<th>Duration of follow up (years)</th>
<th>Clinical features at presentation</th>
<th>Adenoma size</th>
<th>Management</th>
<th>Recurrence and treatment</th>
<th>BMI SDS at diagnosis</th>
<th>Current BMI SDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prolactinoma</td>
<td>15.2 (13.2-15.8)</td>
<td>13 Female</td>
<td>2.90 (0.5-12.0)</td>
<td>Menstrual dysfunction (83.0%) Headache (50.0%) Galactorrhoea (41.6%) Weight gain (41.6%)</td>
<td>9 Macro: 15mm 4 Micro: 6.5 mm</td>
<td>10: Medical Mx 3: Surgical Mx</td>
<td>N=2 Radiotherapy</td>
<td>-0.47 to 3.73</td>
<td>1.39</td>
</tr>
<tr>
<td>NFPA</td>
<td>15.0 (12.0-16.0)</td>
<td>4 Male 2 Female</td>
<td>2.7 (2.0-4.0)</td>
<td>Headache (50.0%) Weight gain (50.0%) Short Stature (50.0%)</td>
<td>4 Macro: 24 mm 2 Micro: 5 mm</td>
<td>4: Surgical Mx</td>
<td>N=2: Surgery + radiotherapy</td>
<td>-0.13 to 2.71</td>
<td>1.10</td>
</tr>
<tr>
<td>Cushing’s Disease</td>
<td>14.0 (4.0-15.7)</td>
<td>3 Male 2 Female</td>
<td>4.4 (0.5 – 8.0)</td>
<td>Weight gain and recent slow growth</td>
<td>1 Macro: 24 mm 4 Micro: 7mm</td>
<td>5: Surgical</td>
<td>N=2 Surgery + radiotherapy</td>
<td>2.12 to 4.07</td>
<td>2.74</td>
</tr>
</tbody>
</table>

Conclusion

- Paediatric PAs are a diverse and challenging pathology requiring long term follow-up within multidisciplinary teams including adult and paediatric endocrinologists, transsphenoidal surgeons and radiologists.
- Prolactinomas in this age group were more likely to be resistant or partially resistant to medical treatment than in adults.
- CD and NFPA may recur following long-term remission, and long-term surveillance is essential.
- Obesity at diagnosis and during follow up are common.
- We suggest active weight management should be recognised as an essential part of medical care.

References:

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