Autoimmune Polyendocrine Syndrome (APS) type 2 is rare disease comprising of:

- Autoimmune Addison’s disease, in combination with
- Thyroid autoimmune disease and/or
- Type 1 diabetes mellitus
- Other non-endocrine autoimmune diseases can be a part of the syndrome

Case Report

- History: 47 years old Caucasian woman, previously fit and well, referred with hyponatraemia and 8 weeks history of fatigue, anorexia, dizziness and weight loss (6.3 kgs).
- Examination: There was significant postural drop in systolic blood pressure on standing (80 mmHg). However, there was no skin or mucosal pigmentation.
- Investigations:

<table>
<thead>
<tr>
<th>Tests</th>
<th>Results</th>
<th>Normal range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium (mmol/l)</td>
<td>122</td>
<td>135-145</td>
</tr>
<tr>
<td>Potassium (mmol/l)</td>
<td>4.5</td>
<td>3.5-5.5</td>
</tr>
<tr>
<td>eGFR (ml/min)</td>
<td>90</td>
<td>&gt;90</td>
</tr>
<tr>
<td>Random plasma glucose (mmol/l)</td>
<td>9.7</td>
<td>4-11</td>
</tr>
<tr>
<td>HbA1c (mmol/mol)</td>
<td>43</td>
<td>&lt;42</td>
</tr>
<tr>
<td>TSH (mU/L)</td>
<td>4.3</td>
<td>0.35-5.5</td>
</tr>
<tr>
<td>ACTH (ng/l)</td>
<td>840</td>
<td>9 am=47, midnight &lt;10</td>
</tr>
</tbody>
</table>

Baseline cortisol (nmol/l) 236 (range >140)
Cortisol 30 minutes after Synacthen 250 mcg i.v. (nmol/l) 247 (normal response: 550, with an increment greater than 200)

Discussion

- Autoimmune Polyendocrine Syndromes (APS) are a heterogeneous group of autoimmune diseases causing impaired function of at least two endocrine glands. Non-endocrine autoimmune diseases are often present.
- The inheritance of APS-II is complex, with genes on chromosome 6 playing a major role.
- APS-II usually starts with a single disease (e.g. Type 1 diabetes, Graves’ disease, Hashimoto thyroiditis or Addison’s disease) and a long time interval is usually present between the manifestations of the first to second/third component of the disease.
- Our patient is unique as type 1 diabetes was confirmed within a month of diagnosis of Addison’s disease, and she developed autoimmune subclinical hypothyroidism shortly thereafter.
- We believe that the long standing cortisol deficiency in our patient had masked her underlying autoimmune diabetes and prevented her from having marked hyperglycaemia which was only evident upon replacing her with glucocorticoids. Figure 1 describes the effect of cortisol on blood glucose and insulin sensitivity.

Conclusion

- Carpenter’s syndrome is rare and only few cases have been reported in literature. Our case to the best of our knowledge is singular as the syndrome manifested with all the features presenting almost simultaneously within a short time span.
- Although it is a rare disease, the consequences can be life threatening if not diagnosed and treated early.
- Long standing cortisol deficiency related to Addison’s disease can mask underlying autoimmune diabetes.
- It is recommended that all patients with idiopathic endocrine deficiencies should be screened for insufficiencies of other endocrine organs.

References: