**ICE Test Name: Child Arginine Stim. (-30)**

**Principle**
Arginine is used as a provocative agent during a stimulation test in the diagnosis of children with suboptimal growth. Arginine reduces somatostatin release and stimulates α-adrenergic receptors resulting in GHRH release. The test has a sensitivity of 75% with a specificity of 85% using a diagnostic cut-off of 7 μg/L\(^1\). This can be increased to a sensitivity of 100% and specificity of 98% if clinical evidence of GHD is also present\(^2\).

**Indication**
- See *Diagnosis of Growth Hormone Deficiency*

**Precautions**
- None

**Side Effects**
- Arginine may cause nausea and some irritation at the infusion site, although this is limited by the infusion being carried out over a 30 minute time period.
- Arginine may also rarely cause anaphylaxis
- In children with suspected hypopituitarism prolonged fasting may induce hypoglycaemia. Blood glucose should be checked by POCT in these patients whenever a sample is taken.

**Preparation**
- Thyroid function should be normal; this must be ascertained before commencing the test.
- GH should be stopped for at least 4 weeks prior to the test.
- Sex steroid priming may be necessary, see *Diagnosis of Growth Hormone Deficiency*
- Patients should have water only for 8 hours prior to the test.
- For very young children, particularly those <1 year, a smaller duration of fast, possibly 4 hours should be adequate. This should be discussed with the consultant endocrinologist.

**Protocol**
1. Insert an indwelling cannula and take a basal blood sample (t= -30). Cannulation may cause growth hormone to rise; therefore the patient should rest for 30 min before the test is commenced.
2. Take a blood sample before commencing the infusion of arginine (t = 0). **Infuse arginine monohydrochloride (10% solution in 0.9% sodium chloride) i.v. over 30 min in a dose of 0.5g/kg body weight up to a maximum of 30g.**
3. Take blood samples for growth hormone 15, 30, 45, 60, 90 and 120 min after the **start** of the arginine infusion (i.e. 15 min sample should be taken during the arginine infusion). At each time point also check the blood glucose of the patient using a blood glucose meter.
Time Points:

<table>
<thead>
<tr>
<th>Time post arginine infusion (min)</th>
<th>Procedure</th>
<th>Blood Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>-30</td>
<td>Check blood glucose using meter</td>
<td>Growth hormone</td>
</tr>
<tr>
<td>0</td>
<td>Check blood glucose using meter</td>
<td>Growth hormone</td>
</tr>
<tr>
<td>15</td>
<td>Check blood glucose using meter</td>
<td>Growth hormone</td>
</tr>
<tr>
<td>30</td>
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<tr>
<td>90</td>
<td>Check blood glucose using meter</td>
<td>Growth hormone</td>
</tr>
<tr>
<td>120</td>
<td>Check blood glucose using meter</td>
<td>Growth hormone</td>
</tr>
</tbody>
</table>

**Samples**

**Growth Hormone** 1 mL clotted blood (white top)

**Interpretation**

- A peak plasma GH concentration of ≥7 µg/L indicates a normal response to the test and no further investigations are required.

- A peak plasma GH concentration of <5 µg/L is diagnostic of growth hormone deficiency but requires a second GH provocation test to confirm.

- A peak plasma GH concentration of 5 – 7 µg/L may still be indicative of GH deficiency and requires further investigation.

- In adults, a peak plasma GH concentration of <3 µg/L is diagnostic of growth hormone deficiency.

- The percentage of children who are not GH deficient and who show a normal response to this test varies from 45 – 93%. Generally 20% of normal children fail to respond to a formal test and this is the reason for doing 2 tests before proceeding to GH therapy. For example, 71% of normal individuals will respond to both insulin tolerance and arginine stimulation tests. However, the others will respond to at least one test: 13% to insulin, 16% to arginine.

**References**
